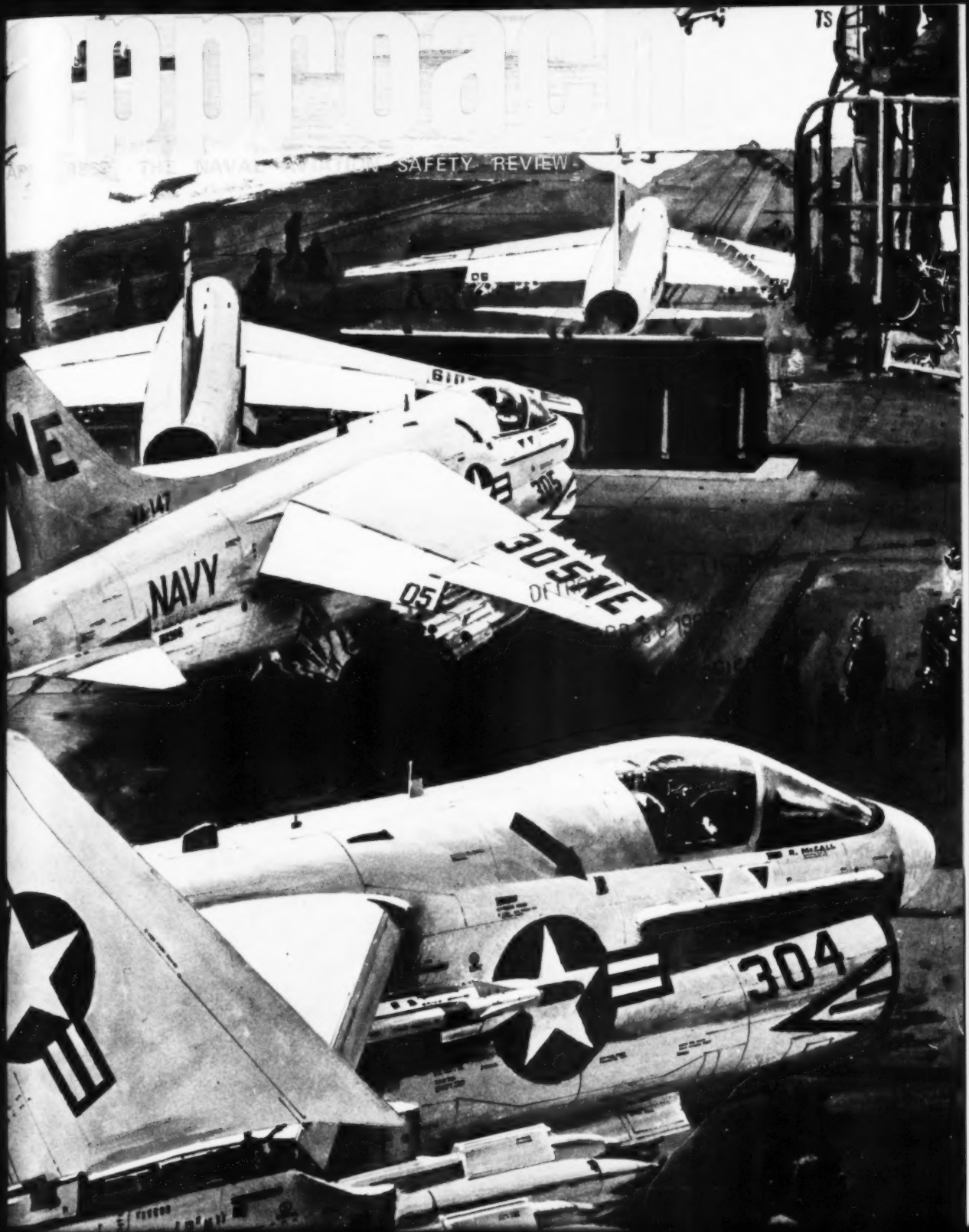

NAVY
305NE
304

Are You Planning to Abort Your Takeoff?

IF YOU are not, you should be. Every time you line up on the runway, add power, release the brakes and begin the takeoff roll you should have some definite plans concerning:

- Under what circumstances you will abort your takeoff.
- How you will execute the abort.

The rules governing actual abort procedures (once you decide to abort) are discussed in considerable detail

not to say that the execution of the takeoff abort is simply a matter of going by the book. The fact is, pilot skill and judgment are necessary adjuncts to NATOPS procedures if a takeoff abort is to be successful. Notwithstanding this fact, the decision as to *whether* to abort or try to get safely airborne is one which will usually require the finest discrimination on the part of the pilot.

When Is It Necessary to Abort a Takeoff?

There are many circumstances which *may* require that a takeoff be aborted. Some of the possible reasons are unacceptable engine acceleration checks, less than normal engine performance indications, illumination of a fire or other warning light, runaway trim, low oil pressure, smoke in the cockpit, a blown tire and, potentially, many others. In spite of the multiplicity of circumstances which *could* dictate or justify a takeoff abort, any statement that a takeoff *must* be aborted has to be well-qualified. That is, a circumstance dictating an abort at the beginning of the takeoff roll may be a different story at the point of liftoff.

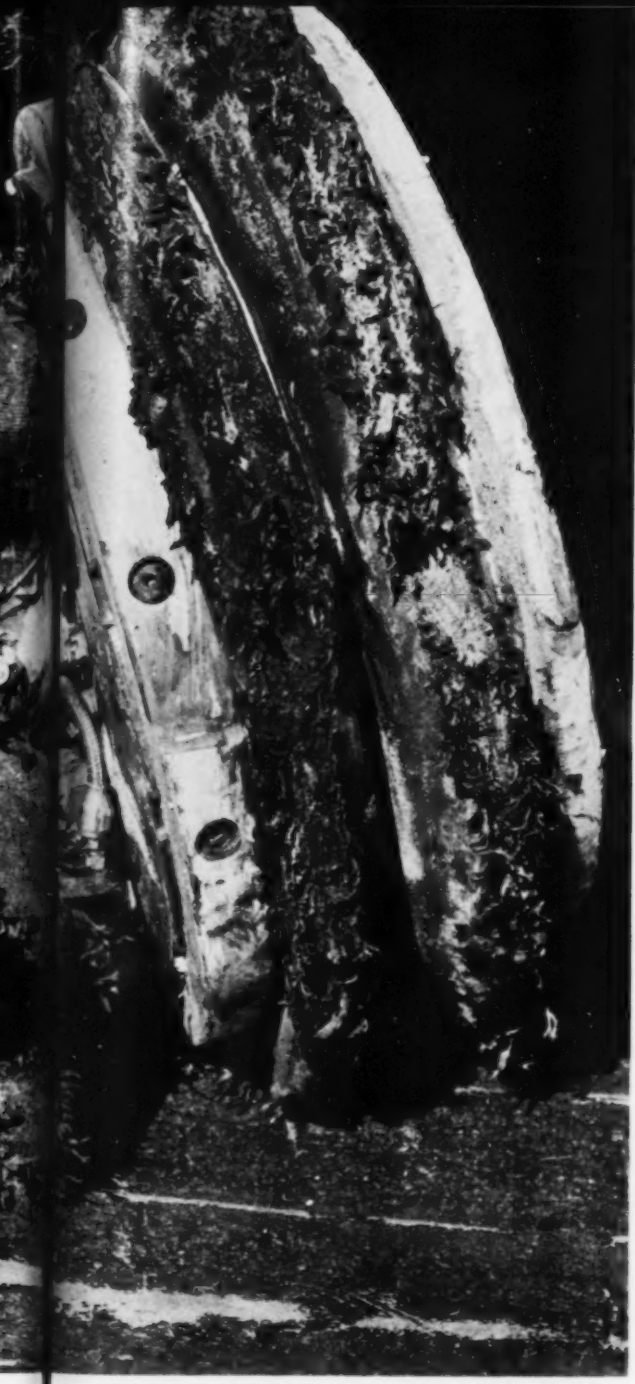
Therefore, the answer to the question, under what circumstances should you abort a takeoff is not always clearcut. The answer to this question must take into consideration the model aircraft, loading, the emergency involved, the length of the runway, the availability of emergency field arresting gear, condition of the overrun and many other factors. In the final analysis, the pilot is the key to the correct decision both as to *when* to abort a takeoff and *how* to do it. Correct decisions by the pilot, in turn, depend upon the individual pilot – the thoroughness of his preflight planning and mental preparation – and his knowledge of the aircraft.

How Serious Is the Abort Problem?

It may not be as serious a threat to naval aviation safety as some other problems are but it is a significant problem. For one thing, the takeoff abort situation, by definition, occurs during the critical takeoff phase of aircraft operation. If something does go wrong, the potential for disaster is greater than it might be during other phases of the flight.

Statistics show that both major takeoff abort accidents and incidents (including minor accidents) have generally followed a decreasing trend during recent years as indicated in the following tabulation:

	CY 65	CY 66	CY 67
Major accidents	9	5	3
Incidents (and minor accidents)	34	44	25



A blown tire on takeoff demands a critical decision by the pilot.

However, preliminary (estimated) CY 1968 statistics indicate a rising rate. Therefore, the substantial progress which has been realized in this area during recent years is in danger of being negated unless this critical phase of aircraft operation continues to receive the positive attention of all concerned.

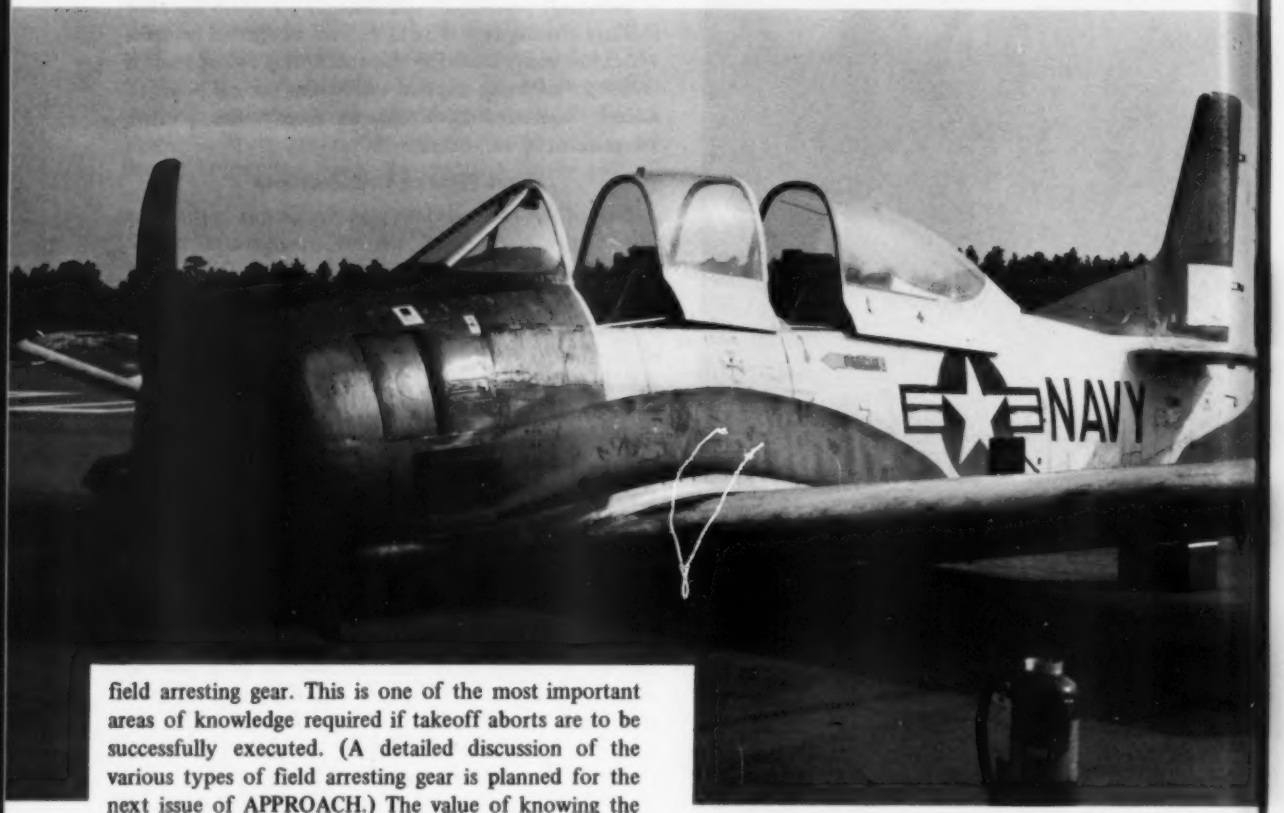
Some Planning Considerations

One of the most obvious planning factors in guarding against the hazards of takeoff emergencies is the requirement that the pilot know his aircraft. This implies that he will also be able to properly discriminate between critical and noncritical malfunctions or circumstances. If fog boils up in the cockpit about the time of liftoff, it will be good to be able to differentiate between an engine malfunction and the more-or-less normal operation of the cockpit air conditioning system under the existing conditions of temperature/humidity. Likewise, if the EGT drops sharply but RPM, fuel flow, airspeed, etc., remain as programmed, a pilot's sure knowledge of his aircraft will enable him to make an *informed* estimate of the best course of action.

The value of knowing your aircraft and the ability to recognize critical and noncritical malfunctions is borne out by an incident in which a student pilot felt the rudder shaker just as he became airborne. He lowered his nose but noted that the angle-of-attack indicator remained at a constant setting. He elected to abort, dropping his hook. The hook failed to engage the abort gear and the aircraft came to a stop 1000 ft past the end of the runway. Investigation failed to disclose any hook marks prior to the arresting gear and it was concluded that the hook was not lowered in time to be fully extended when the aircraft passed the cable. The important lesson in this incident, however, is the value of knowing your aircraft and being able to rapidly assess its proper operation. The student pilot failed to cross-check his airspeed indicator which was working properly. Had he done so, he would have known that he could safely continue the flight regardless of the fact that his angle-of-attack indicator had failed. Fortunately, the student was not injured and the aircraft suffered only minor damage. This was due primarily to the exceptionally good condition of the overrun – which brings up another very important point.

Know Your Field Layout

Knowledge of the field you are operating from can be invaluable. By this, we mean not only the dimensions of the runway and its composition but the condition of the overrun, the nature of the surrounding terrain, location of obstructions such as drainage ditches, intersecting runways or taxiways. Also included in this list of good things to know is the location and layout of emergency



Know your field layout — it may be important if you have to abort.

Know what performance to expect; lack of knowledge can induce trouble, or obscure trouble, depending on the situation.

field arresting gear. This is one of the most important areas of knowledge required if takeoff aborts are to be successfully executed. (A detailed discussion of the various types of field arresting gear is planned for the next issue of APPROACH.) The value of knowing the field layout and the nature of the surrounding terrain is evident from this accident report:

The pilot in this case positioned his aircraft, a T-28, so as to make use of the entire length of the 5000 ft runway for takeoff. The pilot anticipated a crosswind problem and advanced the throttle somewhat slower than usual after releasing the brakes in order to ensure good directional control. The pilot made several minor heading changes prior to the application of 48 inches MAP; however, the aircraft accelerated to 80 kts, was rotated and became airborne after using about 1500 ft of runway. After becoming airborne, at an altitude of 15 ft and accelerating, the landing gear was retracted. Shortly thereafter, just as the aircraft was approaching 100 kts airspeed, both pilots heard what they later described as a loud backfire, followed by a series of lesser ones. With about 2800 ft of runway remaining, the pilot decided to reland the aircraft. He retarded the throttle and left the gear retracted. The aircraft came to rest on the runway 900 ft short of the end. Both pilots evacuated the aircraft uninjured. The cause of this accident was undetermined; however, the investigation brought out the fact that there is a 50-foot dropoff at the end of this runway and this was a definite factor in

the pilot's decision to get back on the runway (gear up) as soon as possible.

Another takeoff accident, involving an A-4E aircraft resulted in fatal injury to the pilot. Although there was some indication that the pilot had a lack of appreciation for the importance of the field layout, the most important factor demonstrated in this tragic accident was the need for planning, including the takeoff roll computations.

Computing the Takeoff Roll

Takeoffs in many of today's aircraft require precise planning. Although during the last 10 years we have seen many runways lengthened from 8000 to 10,000 ft and in some cases, even 12,000 ft – the takeoff roll has become only slightly less critical in many aircraft. A requirement for 5000 to 6000 ft of ground roll is not unusual in many aircraft even in moderate temperatures. Higher temperatures, a tailwind component and other variables such as runway surface conditions, external stores loading on wing stations which protrude forward or near the leading edge of the wing and pilot braking for directional control can cause significant variation in the length of the takeoff roll.

The fact that most aircraft would get safely airborne on a 10,000 ft runway under most conditions can lead the unwary into a trap. The fact is, if anything does go wrong, it may not be possible to get airborne on any runway, regardless of its length. The knowledge that things can and do go wrong on takeoff is important but equally important is the pilot's ability to detect early in the roll any indication that the takeoff is not proceeding as it should. One of the best aids to this determiantion is the computation of the takeoff roll, line speed checks and the go, no-go point.

In the A-4E accident mentioned earlier this was not done, In fact, little if any planning was done prior to this flight. The investigation revealed that only 18 minutes elapsed between the time the pilot arrived in the squadron area and his subsequent request for taxi instructions. In this period of time, he had to don his flight gear, receive the mission brief, brief his wingman, check and sign the yellow sheet, preflight, strap in, start and conduct poststart checks. It is, therefore, obvious that any planning done was at a minimum.

The flight was a two-plane scramble. The two pilots had briefed as they got into their flight gear and went out to man their aircraft. After a radio check between aircraft, the flight leader called for a downwind takeoff in order to save taxi time and expedite the takeoff as this was a scramble hop. The flight of A-4s was cleared to take off; the runup signal was given at which time both pilots ran their aircraft up to 85 percent, checked all instruments, switched to normal fuel, made another check of engine instruments, switched the fuel control back to primary and after a final check and a thumbs-up from the wingman, the flight leader began his takeoff roll.

Each aircraft was loaded with six 500 lb Mk 82 bombs, snakeye finned (3 per MER), two 500 lb Mk 77 fire bombs and one full 300-gal centerline fuel tank, thus making the gross weight of each aircraft approximately 23,000 lbs.

After about 6000 ft of roll the flight leader called that he was aborting. He pulled off power and dropped his hook but the hook was lowered too late to engage the abort gear, located 3500 ft from the end of the runway (6500 ft from the takeoff end). The aircraft continued to roll onto the 1000 ft overrun and off the end through the sand. As the aircraft left the overrun, the pilot initiated ejection. All parts of the egress system functioned normally but the ejection was outside the envelope of the egress system and the pilot received fatal injuries.

As the aircraft left the overrun it received its first damage. The aircraft left the overrun on the centerline at an estimated airspeed of 90 kts, striking a small sandbank which probably collapsed the nose gear. It traveled another 80 ft, struck a radar reflector which imposed some damage to the radome and nose gear assembly. At this time the aircraft was in a nose-low attitude traveling on the centerline drop tank and two main gear. The aircraft traveled in a straight line for 270 ft, decelerating to a speed of about 70-80 kts, then came in contact with strobe lights which were supported on a metal crossbar anchored to two telephone-sized posts buried in the ground but with tops which protruded to a height of 3 ft above the ground. At impact with the strobe light posts, the aircraft received substantial damage and almost simultaneously the high explosive bombs and napalm under the wing detonated. This, coupled with the burning or explosion of a full internal fuel load and a 300 gal external fuel load, resulted in the instantaneous and almost complete disintegration of the

aircraft. The compressor assembly, one of the largest parts recovered, was found 3000 ft from the point of explosion.

The primary cause of this accident – or the reason that the pilot decided to abort – could not be determined; however, the combination of high runway temperature, tailwind component and high gross weight of the aircraft required an extra 2000 ft of takeoff roll which may not have been anticipated by the pilot – and could possibly have been the reason for his decision to abort.

It is recognized that a scramble hop, by definition, implies an urgency to get airborne as soon as possible. It may, therefore, be unfair to criticize a pilot for not stopping to compute the takeoff roll and other data *after* the gong has been sounded. There must be an acceptable alternative, however, to the outcome of this flight. Whether such planning is better developed by an individual pilot well in advance of the actual need – or whether it is done on the spot by the schedules officer or flight duty officer while pilots are suiting up – it is clear that the pilot must be adequately prepared before launching.

Formation Takeoffs Increase Hazards

Another potential problem associated with an aborted takeoff was suggested by this accident. This is; how does an abort affect the rest of the flight? In the case recounted, the wingman was able to get safely airborne but this is not always the case. An accident occurred in which two student pilots were making a section takeoff, chased by an instructor. All three were operating T-2A aircraft. After 1000 ft of the takeoff roll, the lead student noticed that his nosewheel was shimmying and decided to abort. He reduced power to IDLE and transmitted, "Blank lead, aborting."

The second student was now at an estimated 65-70 kts airspeed and he too, decided to abort. He reduced power to IDLE and began intermittent braking but failed to transmit his intentions to the rest of the flight. When the chase pilot noted the No. 2 student braking, he called and instructed him to continue his takeoff. As he completed this transmission the chase pilot became airborne – still slightly behind the No. 2 aircraft. The No. 2 student rogered the chase pilot's instruction to get airborne and again advanced his throttle to 100 percent – momentarily. Then, feeling he could not get safely airborne prior to reaching the abort gear, he again reduced power to IDLE and commenced braking.

The chase pilot, now airborne and just passing the No. 2 man, shifted his attention to the lead student who was on the far left side of the runway, slowing but with hook still up. The chase pilot called, telling him to get in the center of the runway and drop his hook. The student did not answer but the hook came down and the aircraft angled to the right.

Student No. 1 was now less than 1000 ft from the arresting gear and was unable to maneuver his aircraft to the center of the runway before reaching the gear. He got as close to the centerline as possible, returned to runway heading and engaged the E-5-1 arresting gear 68 ft from the left edge of the runway. The aircraft decelerated smoothly to a stop, undamaged, about 375 ft past the point of engagement.

The student in the No. 2 aircraft continued to brake his aircraft at IDLE power. As he approached the abort gear, he dropped his hook; then, seeing that No. 1 was taking the gear, he raised his hook handle but not in time to prevent the hook from engaging the wire (which was now extended as a result of No. 1's engagement). The result was a complete separation of the tail section of the No. 2 aircraft. Neither pilot was injured.

Needless to say, the AAR Board and various endorsers had a lot of pointed comments about this accident and the cause factors but none more pertinent than the fact that the flight instructor had not briefed the flight on emergency procedures.

Proper Briefing Can Avoid Many Problems

A proper briefing on any flight taking off in formation or at close interval is essential. In effect, the course of action must be agreed upon in advance by all members of the flight. It is emphasized that such agreement must be based on NATOPS emergency procedures and other pertinent directives; however, the briefing should be more than a mere reference to applicable NATOPS procedures. It should, at a minimum, cover the steps which each aircraft in the flight will execute should any one of the aircraft be forced to abort.

The phrase, ***"Plan the flight, fly the plan,"*** says it well. The entire flight should be planned in detail but no phase of the flight is more deserving of meticulous flight planning – and execution – than the critical takeoff phase. Finally, proper planning can only be based on a substantial knowledge by the pilot of his aircraft, his operating environment and NATOPS emergency procedures. ◀

Professional longevity in naval aviation is not compatible with judgment founded upon approximation. Flight Surgeon in MOR

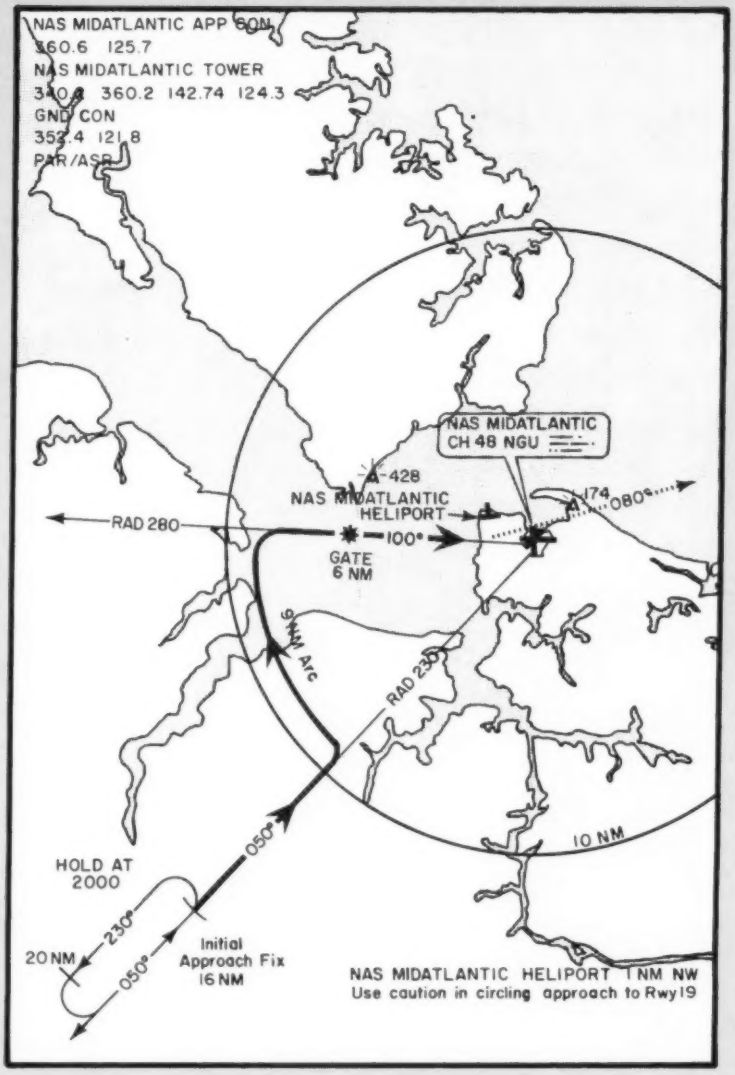
Unscheduled Shortfield Landing

TWO naval aviators took off in a C-117D from NAS Mid-Atlantic for a local proficiency training flight. The plane commander was experienced in both the aircraft and the local area but this was to be a Fam II local area training flight for the copilot.

After completion of the enroute portion of the flight, an actual tacan instrument approach was commenced to NAS Mid-Atlantic with the plane commander in the left seat. The weather was 2000 scattered, 2 miles visibility in fog. The copilot reported 7 miles, inbound. The tower requested a gear check, a report at 3 miles and a report when the runway was in sight.

At 6 miles, the copilot reported "Gear down" to the tower. At 3 miles and 650 ft altitude the copilot was able to see the water and a few ships so he reported "Contact," to the pilot and the tower. The tower advised that the aircraft was not yet in sight but cleared them to land on runway 10. Seconds later the copilot saw a runway to the left and told the pilot, "There it is." At this point, the pilot shifted his scan from instruments to visual flight and also spotted the runway. The approach was continued to the field but during the final stages of the landing it became apparent to both the pilot and copilot that the runway was far shorter than what they had expected; however, the landing was continued.

After touchdown, heavy braking was commenced and the aircraft was brought to an emergency stop – *just 60 ft from a concrete seawall!*



Both pilots knew then that they had mistakenly landed on the 1500-ft long runway 9 at the NAS heliport instead of the 7350-ft long runway 10 at NAS Mid-Atlantic.

After a few minutes to allow nerves to settle, the C-117D made a 180 on the runway and followed a crash truck to a parking spot.

Moral: Detailed study of the approach plate and proper mental preparation prior to commencing this approach would have prevented this incident. Such preparation is insurance which the naval aviator cannot afford to be without. Furthermore, this is a clear case of jumping to conclusions. That is, as soon as a runway (any runway) was spotted, both pilots decided "That's it," and dismissed from their minds any other possibilities. Proper preparation, alertness and good headwork are essential on any flight, from chock to chock. ◄

ACCEPTANCE TEST FLIGHT

THE SQUADRON received an SH-3A from NARF (Naval Air Rework Facility). A second PAR (progressive aircraft rework) and a sixth calendar inspection had been completed. NARF test pilots had flown the helicopter about three hours before turning the plane over to the squadron. Squadron maintenance had checked all the work done at NARF, reviewed log book entries and readied the helicopter for a routine acceptance test flight.

The squadron test pilots were well qualified. They were both HACs – helicopter aircraft commanders. The senior of the two was also a designated maintenance test pilot with over 1000 hours in model. The copilot, although not a designated test pilot, had over 500 hours in model. The crew chief was equally well qualified for his duties.

The initial phase of the test hop was spent at NAS Homefield and consisted of extensive hover checks. Upon completion of the hover checks the pilot proceeded to a specific area approximately 7 miles off the coast. While flying at 200 ft and 75 kts he elected to check the fuel dump system. As seen in Fig. 1 the NATOPS manual publishes a warning concerning the operation of the fuel dump system. A warning, by definition, is an operating procedure or practice which will result in injury or death if not carefully followed.

WARNING

To preclude possible flameout do not open either fuel dump valve unless the crossfeed valve is open, all boost pumps are turned on and at least one boost pump is operating.

Fig.1

The NARF test pilots, prior to delivery of the plane to the squadron, had not performed this check – their test procedures did not require it. The NATOPS manual is explicit that flameout can occur if correct procedures are not followed. Attempts to dump fuel from the forward fuselage tank were successful. However, when the crew chief opened the aft tank dump valve, on order from the pilot, no indications of fuel being dumped could be detected. The pilot secured the crossfeed valve in an effort to get the correct indication by isolating the two fuel tanks. (The crewman had observed no indication of dumping and had secured the dump valve.) Dumping operations were discontinued. At this time, the copilot who was at the controls, alerted the pilot by saying, "We are on ONE, full power". The pilot added full power but observed the needles of the Nr (rotor RPM) and Nf (turbine speed) at 92 percent and decreasing rapidly. The pilot took control and attempted to salvage an autorotation without success (Nr was then

approaching 60-70 percent). The aircraft did not respond to control changes, entered a shallow dive, rolled slowly to port and hit the water. The pilot and crew chief were thrown free as the helicopter broke up and were rescued by a civilian pleasure boat. The copilot and aircraft disappeared beneath the surface and were not recovered.

In a twin turbine-powered aircraft the chance of losing both engines is remote. However, to allow for that one-in-a-million chance autorotations are practiced and pilots become very proficient in this maneuver. To successfully execute an autorotation helicopter pilots must adhere to the three most important rules of helicopter flying: maintain rotor speed, MAINTAIN ROTOR SPEED, *MAINTAIN ROTOR SPEED!!*

> Failure of both engines requires immediate action if a safe power-off landing is to be accomplished. . . . Immediately upon a two-engine failure rotary wing rpm will decay and the helicopter will yaw to the left. Collective pitch must be immediately reduced to prevent excessive loss of rotary wing rpm and right rotary rudder should be applied to compensate for loss of torque to control heading. If at low airspeed and high power setting, apply forward cyclic stick in an attempt to regain airspeed (minimum 70 kts). This action normally requires 400/500 ft of altitude if the recovery is initiated at zero airspeed.
>
> **WARNING**
>
> If collective pitch is not reduced immediately rotor speed will decay to the point where blade stall will occur.

Fig. 2

The information and WARNING in Fig. 2 are taken directly from the SH-3A NATOPS manual and stresses the need for speedy action. The WARNING outlines the consequences if that quick action is not taken.

In aviation an old time general rule to follow, for most test flights, is to have plenty of altitude. Without question in this tragedy altitude was particularly desirable. The height-velocity diagram for the SH-3A, for dual-engine flameout, shows that the pilots were in an undesirable flight regime. When the flameout occurred, had they been descending, as on approach, they undoubtedly would have been able to make a safe, full autorotation. But reaction time was in excess of the allowable one or two seconds and rotor speed quickly deteriorated into unsafe flight. Another consideration, not to ignore, is the immediate action necessary if the BAR ALT (barometric altitude) of the automatic stabilization equipment is on and operating. In the event of single engine or dual engine flameout, with the BAR ALT engaged, and hands off the collective, signals are sent to increase collective to maintain altitude. This causes further decay in rotor speed. The BAR ALT signals must be anticipated and overcome and the equipment turned off. Every helicopter NATOPS manual includes a height-velocity diagram which pilots should commit to memory or have available for frequent reference. The height-velocity diagram, Figure 3 below, is set forth under optimum conditions. It is the best set of conditions possible and does not allow for slow reactions or indecision.

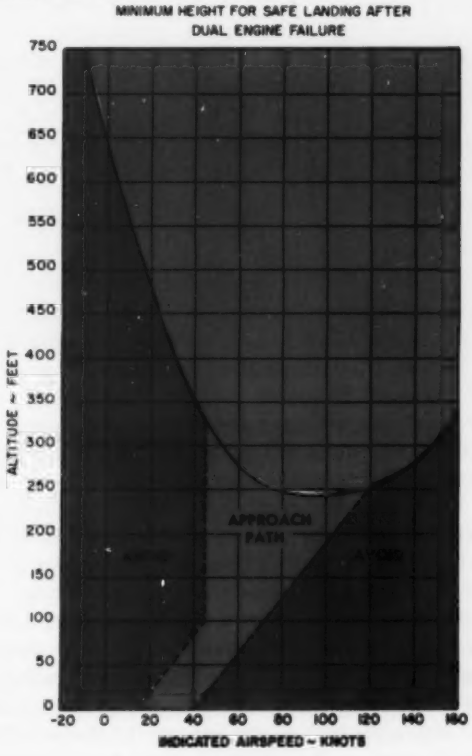


Fig. 3

Notice in Fig. 3, for dual-engine flameout, there is no low altitude regime which is safe. The combination of low altitude and certain airspeeds are acceptable only in the "approach path."

The lesson to learn here rings loud and clear, plan a test flight as thoroughly as you plan a tactical flight. Pilots need to carefully review emergency procedures before a test hop and have a clear understanding of what each is responsible for. In helicopter test flying give yourself the altitude and airspeed combination which is compatible with the height-velocity diagram for your chopper. Stay out of the dead man's curve and LIVE.

A Bedtime Story for the New

"WELL, this is it" I remember thinking to myself. "Yesterday I was a copilot, today I'm a plane commander about to launch on a one week detachment for night plane guard during Fleet Week (Fleet use of the Training Command carrier) on the training carrier." The paperwork for plane commander was moving pretty slowly until the requirement was placed on us for night plane guard duty. Well, I couldn't complain. I had been getting pretty anxious waiting to be designated and this seemed like a good way of getting kicked out of the nest and being on my own. With my own crew and the prospects of getting away from the cold North for some warm southern sunshine, things were looking bright. Due to a favorable weather brief we set out on our first leg VFR together as a flight of three helos. Everything was fine until "1200 ft broken" rapidly became 600 ft overcast in rain. A check with "Metro" confirmed that weather was deteriorating down the road so we made a quick change of flight plan and picked our way into an NAS short of the halfway point on our first leg.

After a day and a half of waiting for conditions to improve to IFR minimums we all agreed that progress had been slim. We could have made it further on horseback. So, on the night of day No. 2, we launched IFR and completed our first leg. Early on day No. 3 we pushed on for our destination with one enroute stop.

Everything went well with the exception of a few anxious moments when it appeared that I was in danger of being "VFR on top" on a VFR flight plan with no radios. After some feverish switching I was finally able to get my radios back on the line and the clouds below began to break up. We all arrived at our destination late that afternoon.

After a restful night in our "Splinterville" quarters we spent the early part of day No. 4 preparing the aircraft for night plane guard. We launched in the late afternoon and returned eight hours and two hot refueling stops later. My tacan quit on the way out and my UHF died just as I entered the soup on the flight back to the Air Station. Fortunately, I had good HF with the other helos and they provided me with communications for returning and landing.

The next problem facing me was how to get my inoperative radio gear in an up status for the following night's launch. Not versed in the intricacies of the Navy supply system, I armed myself with the advice of our supply officer, and a strong will and set out to find the way. After checking out a stake truck in the early morning of day No. 5 I was able to find a sympathetic ear in the person of the executive officer of the Naval Air Rework Facility. He magnanimously gave me top priority customer service and the gear was fixed and installed before launch time. Confident that this launch would go without further difficulty we manned the aircraft and promptly burned out both of our VGI's when external power was applied. Due to misrouted wires in the power unit we were given 220V instead of 115V. The same unit had been used on the other two helos and when we mustered undamaged VGI's we found there were only enough for one helo. Due to our inability to put two helos on station it was necessary to cancel the night's carqual operations and extend

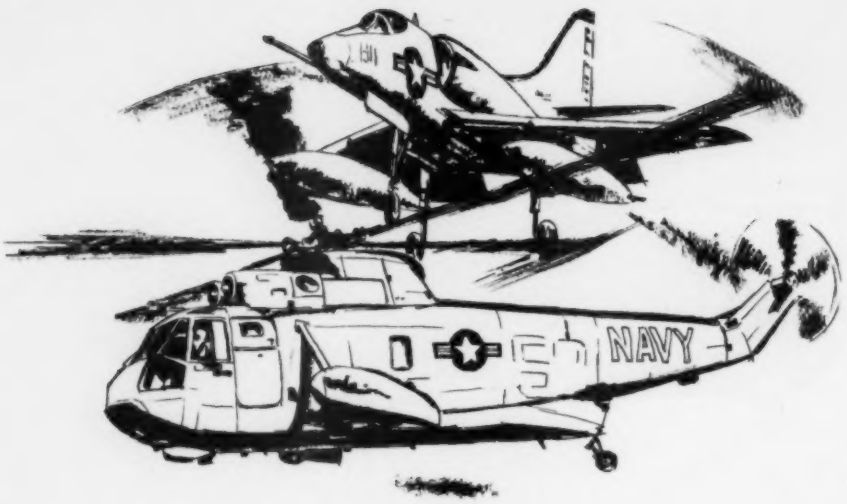
Plane Commander

by LT G.D. NICKERSON, USN

everything by one night. Late into the evening the Det O-in-C alternated between Autovon and the Raspberry circuit to the ship and somewhere into his third pack of cigarettes had assurances that at daybreak VGI's would be pouring in by jet and transport from different parts of the country.

The next morning the VGI's arrived and we were once more ready to go. After all our difficulties I was determined that night No. 6 was going to be flawless. I even changed my socks. (I have a theory that to change one's socks is to change one's luck. Several of my copilots have encouraged this theory and have even said that they feel lucky when I change my socks.) Unfortunately, however, this was to be my worst night.

First, my UHF quit while I was taxiing for takeoff. Because of exceptionally good HF, I decided to continue, using my HF and the other helo's UHF to relay communications. Next, my crewman got soaked down with oil from the overhead when I landed aboard the CVS for the first hot refueling of the night. The necessity to shut down and check the cause and extent of the leak brought great pressure from the ship to my new plane commander mind, but I saw no alternative and I quickly shut down. Determining that my helo was OK, I started up again. My next problem was 50 kts of jet turn-up blast from about 45 degrees off my nose. This was well outside my safe rotor engagement envelope and I had to wait for acceptable conditions. I gathered from the flight deck officer's clenched fist that the ship was anxious for my departure but I took a deep breath and tried not to become rattled. As soon as possible I engaged rotors and the plane director signaled for me to take off. Fortunately, I had resolved not to allow myself to be rushed into making a mistake and I



realized that the plane director was unwittingly setting me up for an external load which had been attempted before with spectacular failure. Accordingly, I gave him the standard signal for removing chains. His "Mickey Mouse ears" must have been burning because he ignored my efforts and more emphatically gave me the take off signal. Finally, I was able to explain my problem to the flight deck officer who was, by then, beating on the side of my cockpit with his fists. Chains removed, I took off from the angle and requested immediate clearance across the bow to expedite my arrival in plane guard position. One of the helos relayed the request and said I was cleared. By this time I was nearly at the bow and I asked the other helo to verify that I was cleared immediately across the bow. He verified and I started across. I knew my first crewman had a tendency to stutter when he got excited so I wasted no time in getting my eyes off the gages and outside when I heard "It's a p-p-p-p-plane." What met my eyes was a somewhat breath-taking view of a jet as it came off the CAT. I reversed my turn and bottomed my collective and managed to level off at 60 ft as the jet swooshed overhead. After several moments of very still silence my crewman finally managed to blurt out "That was the b-b-b-biggest little p-p-p-p-plane I ever saw!" I then proceeded upwind and crept over into starboard Delta where I spent the rest of the period muttering to myself.

The evening of day No. 7 went by without a hitch and with carquals completed we made preparations to go home. On the following day we were starting engines for the first leg of the journey home when I again ran into a problem.

I had occasionally experienced hot starts on No. 1 engine throughout the week but I had been able to overcome the problem by using a "milking" procedure which was a fairly common remedy. This time, however, I was unable to get the engine to operate properly so I shut down. The mech's inspection revealed a slight crack in the burner basket, necessitating an engine change. Phone conversation with our squadron informed us that one of the other pilots and I were on the next day's flight schedule for some quals which had been scheduled for the new crews. We were told to take one of the good SH-3's and head home as soon as we could. Although I disliked leaving my helo behind, I was somewhat relieved to have the week done. But . . . there was one final surprise. At approximately 2300 at 3500 ft, 70 miles from our second fuel stop we took a bird through our engine.

It could probably be said that naval aviators are not reluctant to relate past experiences and I suppose I'm no exception.

I arrived home having been deluged with a wealth of experience for such a short period of time in my new status. It had been clearly demonstrated that the flying machine has little consideration for the vulnerable position of the tender new plane commander. When I see a new plane commander my line is quite predictable: "Did I ever tell you about my first flight as a plane commander . . . ?" ◄

A CH-53A arrived at the ammunition supply point, landed and ascertained that its assigned load was ready for pickup. The load consisted of about 8000 pounds of 8-inch ammunition located in an area measuring about 75 to 80 yards on each side. The north side was open and the remaining three sides were enclosed by 15 ft high earthen walls.

The aircraft approached the load from the north (open side). The hookup was accomplished without incident. A pendant was not utilized. After hookup the pilot attempted to change heading approximately 25 degrees to take better advantage of the wind. Witnesses stated that in doing so, the tail dipped and the rotary rudder contacted a *Conex* container in the center of the pickup zone. The aircraft stabilized momentarily, the tail structure bent toward the port side, broke off and flew over the top of the helicopter. The load remained hooked up and on deck. The aircraft entered a state of rapid rotation and completed two rotations prior to contacting the ground and the load. Fire resulted when the starboard side of the helicopter's nose made contact with the load. The cockpit broke open upon impact leaving a large open space on the starboard side.

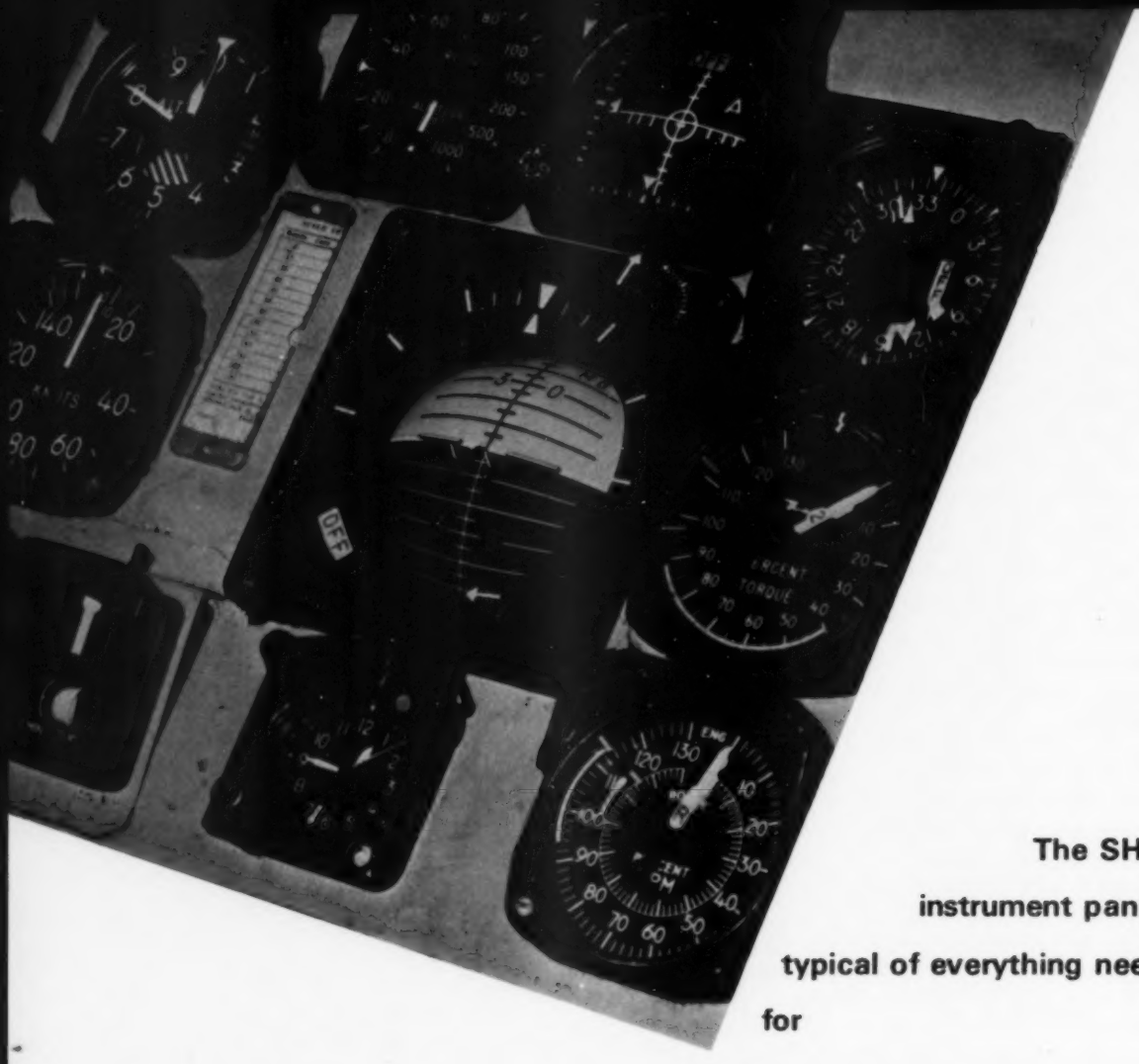
Both of the pilots and the three crewmembers escaped by seeking shelter in nearby revetments but all suffered Bravo injuries as a result of the crash.

The aircraft accident board determined the accident to be due to pilot factor but noted that the environment and tempo of operations were significant factors.

Military exigencies may well require operations be conducted in less than ideal circumstances and at a tempo far in excess of normal. When this occurs, it is clear that caution, superior judgment and expertise must prevail in proportion to the hazards of the environment and the increase in tempo if disaster is to be averted. ◄

BLOW UP

THESE photographs illustrate the destruction which was wrought by the accidental explosion of approximately 200 tons of ammunition at a site in Vietnam.



The SH-3A instrument panel is typical of everything needed for

Helicopter Instrument Flying!

INSTRUMENT flying in helicopters is not the simple, routine type flying that one takes for granted in fixed wing airplanes. Yet, there does not seem to be any particular reason for the difference. It is true that 10 or 15 years ago helicopters either did not have the instruments to conduct instrument flight or those that did have basic instruments were flown by pilots who were prohibited from entering instrument flight conditions. This is no longer true. Present day helicopters are fully instrumented, flight control systems are reliable and multiple power plants exist in many models. For these reasons helicopter instrument flying should be no different, from the hardware standpoint, than in fixed wing types. This leads one then to take a look at the pilots themselves and the various helicopter instrument training syllabi.

As a general rule helicopter pilots are not subject to much actual instrument flying. Most flights, utility and antisubmarine warfare, are flown below 1000 ft under visual meteorological conditions. *(Exception to this generalization is granted to the overworked, overexposed helicopter pilots in Vietnam.)* Many will contend, because of vertical instability, that in a helicopter any night flight at sea, is an instrument flight. This is only partially true. Any time a helicopter pilot can refer to a horizon, to the lights of ships, cities and airports or use his landing lights to illuminate the surface he usually does so in preference to staying on-the-gages. If he's wise he is cross-checking constantly but he subconsciously remains visual. One does not contend that actual instrument conditions must exist in order to be on instruments. The contention merely is that the opportunity to simulate instrument flying or the number of times that a flight is conducted in actual instrument conditions is much less in helicopters than in any other type of aircraft.

An examination of various helicopter instrument syllabi and discussions with fleet operators, both Navy and Marine, indicate that most pilots have a good instrument base when they leave Ellyson Field. The ground and flight syllabi consist of over 30 hours devoted to instruments. The ground school lesson plans are comprehensive. They include flight planning, flight procedures, ATC procedures, instrument navigation, ADF and tacan procedures as well as flight rules and regulations. The latter includes Federal Aviation Regulations and OpNav Instruction 3710.7 series. The instrument flight phase is also complete. There are several basic instrument flights, several radio instrument flights and a couple of cross-country flights to put it all together. A final two-hour flight check is a thorough, sweat-producing wringout. When a student passes this check he can be proud of his accomplishment.

Once the helicopter pilot leaves the training command with his instrument card and helicopter ticket, the advanced instrument training or polishing continues even as he enters the operational arena. Although the instrument syllabus at East Coast and West Coast combat replacement squadrons is not the same, the syllabi are tailored to fit the needs of the Atlantic and Pacific fleets. The West Coast HC and HS replacement squadrons both send their students to a one-week instrument ground school. Upon completion the students return for the flight phase. The students receive four or five instrument hops of 2-1/2 hours each. Flight instructors are all experienced, second-tour pilots, usually possess green cards and usually are designated members of the instrument board. The East Coast HS replacement squadron is more of a do-it-yourself outfit. They conduct the instrument ground school as well as the flight phase. Students are given a formal ground school and a short WST* course. Day flights are hooded but night training flights are not hooded. Similar to their West Coast brothers the instructors also are experienced, second-tour pilots and most possess green cards. The instructors themselves receive a standardization check every six months in addition to an annual instrument renewal check and an annual NATOPS check. In the Marine squadrons one finds a similar situation with few exceptions. If anything, the Marines are a little less formal but their ground and flight syllabi cover most of the material covered by the Navy replacement squadrons. The WST courses conducted by the Marines are in conjunction with their instrument flight syllabus. The conclusion that one draws is that the young helicopter pilot is fairly well versed in instruments as he becomes a member of an operational squadron.

Maintaining this excellent instrument proficiency is another matter. Once the average helicopter pilot completes the replacement squadron syllabus and goes on to bigger and better things – tactics, rough terrain, external cargo, search and rescue, in his operational squadron – his instrument qualifications seem to deteriorate in a hurry. In a few cases (HC more than HS) some helicopter pilots are almost total strangers to actual instrument flying and when faced with actual

* Weapons Systems Trainer

instrument conditions are unable to cope with this environment.

The following incident indicates how unnecessary, even foolish, it is to press-on in a hopeless situation. During night carrier qualifications the carrier entered a fog bank. A UH-2C had been the plane guard helicopter and was taken under radar control for a CCA under near *zero/zero* weather conditions. On the first approach the helicopter was turned on final at 1-1/2 miles. (CVA/CVS NATOPS establishes a 3-mile gate and 500 ft altitude in a landing configuration for helicopter IFR approaches and establishes helicopter minimums for PAR approaches as 200 ft and 1/2 mile.) The pilot had lineup difficulties; he drifted 200 ft left of center line, to 100 ft right of center line, back to 100 ft left of center line as he passed the ramp and then waved off and paralleled the ship down the port side. On the second approach after turning final at 1 mile the pilot was informed that the precision radar was inoperative. (Helicopter minimums then became 300 ft and 3/4 mile.) The controller continued giving vectors to 1/2 mile from the carrier then reported the aircraft off the scope and gave the pilot a left turn. The pilot at 150 ft and 65 kts saw the deck through a hole in the fog and started to flare with the intention of landing. While in the flare the pilot lost sight of the deck due to the fog but could still see the ship's deck lights and attempted to hover. He became disoriented and, while transitioning to a waveoff, let the nose fall through setting up a high rate of descent. The helicopter was observed passing over the deck angling left to right and descending rapidly as it passed over the starboard side forward of the island. Fig. 1 traces the path of the helicopter.

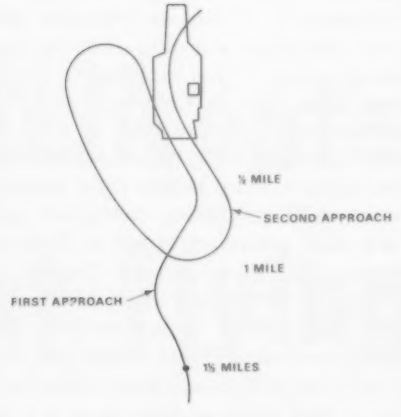
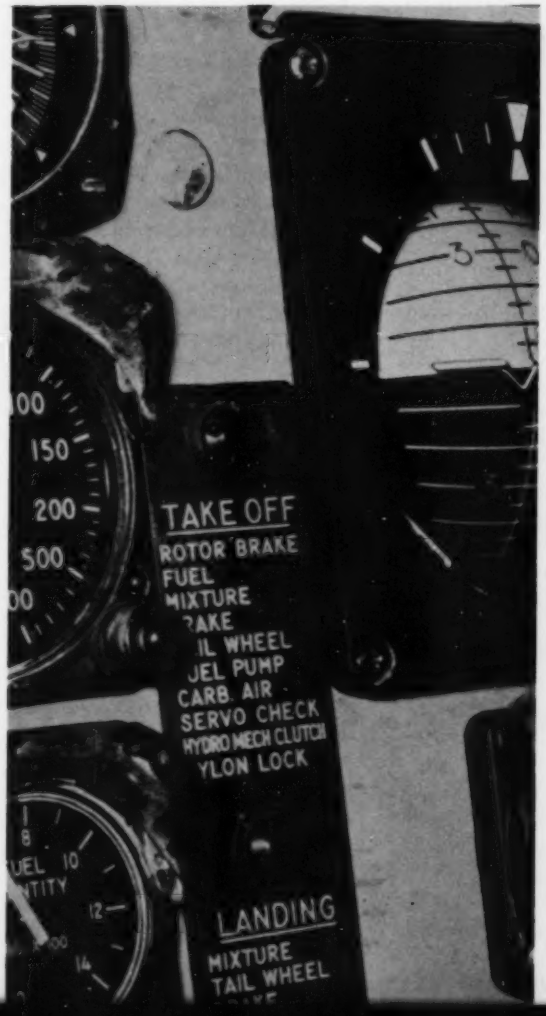


Fig. 1

As the helicopter descended through 80 ft the copilot yelled, "Altitude!" Then realizing the urgency of the situation he applied full up collective and full back cyclic. The helicopter bottomed out between 10 and 20 ft and started climbing. A climb to VFR-on-top was made and this time the helicopter was bingoed to a naval air station about 50 miles away and landed without further complications. The officer-in-charge commented, "The pilot clearly overestimated his ability. His last radar approach was a day GCA two months prior to this incident and his last CCA had been seven months ago." The O-in-C also commented on NATOPS deviations by the controller and further pointed out that there had been a critical shortage of helicopters for training hops prior to deployment. The pilot in this incident was very lucky. Thanks to a strong copilot, who also was mighty quick, an accident did not occur. The events which took place this particular night should be indelibly stamped in the memory of all helicopter pilots.



AIRCRAFT	APPROACH	MINIMUMS (feet/miles)
Jet	Non-Precision	600/1-1/4
	PAR	200/ 1/2
Prop/Turboprop	Non-Precision	400/1
	PAR	200/ 1/2
Helo	Non-Precision	300/ 3/4
	PAR	200/ 1/2

Figure 5-11. Approach Minimums

CVS NATOPS Manual

It would appear from this incident that there is a necessity to comment on some very basic things.

- CVA/CVS NATOPS, approach minimums, P5-19 says: "When a suitable bingo field is available, aircraft shall not commence an approach if the reported weather is below the minimums in Fig. 5-11, unless it has been determined that the aircraft has sufficient fuel to proceed to the bingo field in the event of a missed approach."
- Instructions, except waveoffs, from CCA, GCA, or approach control are advisory only.
- A thorough briefing of the copilot on pilot intentions is a must! This includes approach procedures, altitudes, airspeeds, emergencies, missed approach procedures, no matter what kind of an approach is being flown.
- Whenever minimums are reached, whether advised by the controller or not, a missed approach must be initiated unless the deck or runway environment is in sight and a landing can be made.

This indictment of the instrument proficiency on the part of helicopter pilots is intentional. What then is the answer? Unless a concerted effort is made from squadron commanding officers on down, helicopter pilots are doomed to second rate status as instrument pilots. One submits that regular and frequent simulated and actual instrument flights including approaches to minimums are desirable and should be encouraged by supervisory personnel. It is very easy to lose currency. OpNav Instruction 3710.7, pg. 13-1, spells out currency – within six months: 10 hours of actual/simulated instruments or 12 penetrations/approaches of which three are actual instrument approaches; six actual/simulated approaches to minimums; and six actual/simulated precision approaches. Commanding officers of carriers must make CCA available to helicopter pilots as well as fixed wing pilots. In short, helicopter pilots must take advantage of every opportunity and even badger shore-based and ship-based CCA/GCA units for assistance, if necessary, to keep current. ◄

Short Snorts

Too Much Power

Too much power caused the landing gear damage shown above.

A STUDENT solo pilot was practicing touch-and-go night landings in a pattern with other T-2A aircraft. After five normal and satisfactory landings, he planned to make the sixth his last and hence to a full stop in the *Buckeye*. Touchdown was about 1500 ft down the 8000 ft runway at 15 increments angle of attack and an estimated 95 kts. After about 4000 ft of rollout (5500 ft down the pavement) airspeed was still approximately 70 kts, when the aircraft began a starboard swerve.

The combination of being too fast and gaining on the plane ahead (also making a full stop landing) had caused the pilot to commence heavy braking which contributed to his loss of directional control. Five hundred ft from the end of the runway, the starboard MLG struck a runway marker light as it left the pavement. Two hundred ft farther along, the port MLG also struck a marker light just before it went off the concrete. Speed was still about 50 kts and the aircraft crossed a taxiway which had a six inch curb on its far side. The protrusion sheared the nose gear and the trainer came to rest on its nose about 200 ft beyond the taxiway.

Investigation concluded that the student failed to keep the power control lever in the idle position. Most jets idle between 35-48 percent at S.L. This is about 5 percent of the maximum *thrust* and enough to require positive braking. In any case, if by some oversight, the engine is running faster than its specified idle RPM, the stopping problem is magnified. The NATOPS Flight Manuals for jet aircraft recommend shutting down the engine(s) when normal breaking is not effective such as on a wet runway.

Missing

THREE aircraft, one A-3 and two A-4s departed NAS Far East for their carrier off the coast of Viet Nam. They were all from different squadrons and were quite casual about the return to the ship. The senior of the three aviators was the last to show up at Operations. He took a cursory look at the single flight plan that the A-3 pilot had filed for all of them and then they left to climb into their planes.

Takeoff was routine and after reaching cruise altitude, on their hop of 750 nm, the A-3 pilot asked one of the A-4 pilots to practice plug-ins. When plug-ins had been completed the A-4 slid out into an easy wing position and the three held these positions for over an hour – two in formation and the senior above and behind.

As they got closer to their destination several frequency changes were required. One of the A-4s did not acknowledge. The other two pilots craned their necks looking for the A-4 and made many calls trying to reach the pilot. A massive search was begun immediately but brought negative results. Two days later the SAR efforts were suspended.

The cause of the accident is unknown. The most probable cause, so said the aircraft accident investigation board, was loss of consciousness from undetermined reasons. The pilot was fatigued and there was a lack of preflight planning and formation integrity. The board recommended emphasis be placed on the hazards of fatigue and the requirement for preflight briefings and formation integrity.

In reconstructing the events it is difficult to understand the lack of a complete brief among the pilots – pointed out by the accident board. Another important fact was the failure of the missing pilot to maintain a good wing position even if it was a loose cruise formation. The fact that the missing pilot was senior might explain the other two pilot's hesitancy to question his actions. However, we feel that the intregity of any formation flight is dependent on the actions of the whole flight. The pilots of the other two aircraft should have made radio checks to inquire as to the missing pilots status as well as looking frequently to see where he was.

Again a glaring point is made clear. No matter how routine the hop appears at the outset, there is no warranty that it will progress and/or end that way. ALWAYS brief the hop and fly the hop as briefed.

Limited damage to C-121.
How did it happen?

Can You Guess What Happened?

NUMBER FOUR engine was removed without adding ballast to the nose or installation of a tail stand. No great delay was expected, so 14,000 lbs of cargo were left aboard. As a result, the center of gravity shifted far enough aft so that the weight of one crewman going aboard (to get the tail stand) was enough to settle this bird on its tail.

Radar Explosion

A *CRUSADER* was being given an airborne radar check. While the APS-67 was set on the "search" position, the pilot ignited the AB. Then, when indicating 425 kts, he put the F-8C in an 6 G level turn. A moment later a loud explosion occurred followed by engine flameout. Level flight was quickly reestablished and the engine responded to a relight as advertised. In the next few minutes, many checks were made. All mechanical systems of the aircraft seemed to be in good working order. The radome, however, seemed to be missing as best the pilot could see from the cockpit. An uneventful precautionary landing was made at homebase.

Inspection of the APS-67 radar revealed that a transformer had overheated and produced a volatile gas which created the explosion. The blast shattered the radar pressure dome and some of the pieces were ingested into the engine. The inert gases of the explosion were sucked into the engine air intake causing momentary oxygen starvation which flamed out the jet. Everything in the air duct had returned to normal when the re-start was initiated.

Airborne radars and their components should be constantly inspected to prevent malfunctions of this nature. ◄

TS-2A about to touchdown. Note port prop is not quite feathered.

Nearly Everything Right

CONCLUSIONS of most aircraft accident boards usually begin with the shortcomings of the pilot, so it is particularly pleasing to report the conclusion of one board which said, "The pilot and crew performed in an outstanding manner under emergency conditions. Their skillful handling of this emergency kept aircraft damage to a minimum."

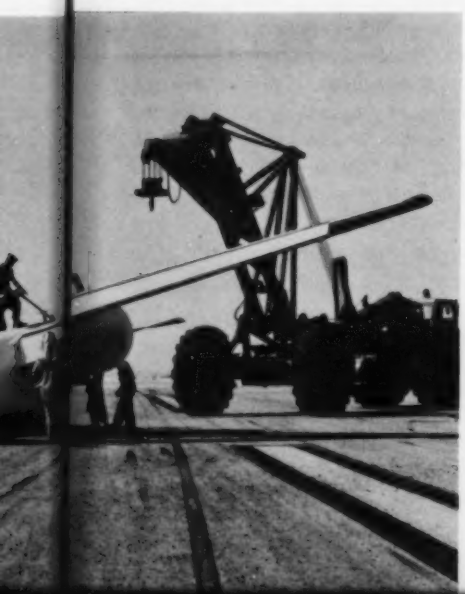
An instructor pilot and two student aviators were airborne one day in a TS-2A shooting touch-and-go landings during a local training and familiarization flight. On the tenth approach one of the students placed the gear handle down. The starboard MLG remained up with the gear doors apparently open. The instructor pilot, in the right seat, took control, departed the outlying field pattern and flew back to mainside. While enroute he contacted the ASO on base radio and discussed the problem. Hydraulic pressure and quantity were normal and remained this way throughout the period of the emergency. Another squadron plane was alerted and flew close by for a visual check. He reported that he was unable to see why the MLG wouldn't lower. The instructor pilot, meanwhile, changed seats with his student and then conducted a thorough briefing

There was very little damage and no fire.

The broken starboard MLG door horn assembly caused the whole thing.

of what would be attempted to get the gear down. All emergency procedures were tried unsuccessfully.

Approximately 30 minutes later, while he was attempting various maneuvers, the port engine loosed a long series of rapid backfires – 10 to 20 of them. At this time an emergency was declared and runway foaming was requested.



Power on the backfiring engine was reduced and the power plant smoothed out. While waiting for the foaming operation to be completed a second squadron plane flew by for another inspection. The pilot of the second plane used binoculars and reported that the door actuating cylinder had broken away from the door horn assembly on the inboard MLG door. The pilot of the sick bird then repeated everything in the book, and a few more, to try to get the gear down. He did not succeed. A decision was then made to make an intentional wheels-up landing in the foam.

The crash crew laid a blanket of foam 2000 ft long and 60 ft wide on the long runway in 20 minutes. (Wind was light and variable.) The field arresting gear was removed and the pilot was advised not to drop his hook. A full-flap, 90-kt approach was selected and after carefully reviewing all procedures the instructor pilot and his copilot started a final approach. The pilots agreed they would feather the starboard engine approaching the runway and, when secured, would follow up and feather the port engine last. This was done.

The aircraft touched down 5 ft short of the foam. It remained upright as it slid completely through the prepared area and stopped about 230 ft beyond the end of the foam. A small amount of smoke quickly dissipated and no fire broke out. Damage to the aircraft centered around the lower fuselage where contact was made with the runway and the port wing tip which scraped the runway after speed was lost. The port engine and propellor were changed due to suspected sudden stoppage. The port prop had not completely feathered when touchdown occurred.

Investigation revealed that the starboard inboard horn assembly had failed at the upper end where the MLG door actuating cylinder is attached. A close inspection of the horn assembly disclosed an earlier failure based on discoloration of the failed part. The main wheels are held in up position by the J-hook in the engine nacelle. Through a mechanical linkage from the outboard wheel-well door to the J-hook assembly the J-hook is released allowing the MLG to be lowered by hydraulic pressure. The outboard MLG door must be fully opened before the MLG can be released. After the accident, when the plane was lifted, the MLG was easily pumped down and locked after the outboard door was manually pulled open. The Board recommended that a study be conducted on the feasibility of installing a manual release for the MLG uplock assembly. As an interim measure the squadron is investigating manufacturing a sectioned metal rod to manually force the outer door open to release the J-hook.

THE IMPORTANCE OF BRIEFING

TAKEOFF time: 1900 local.

The hop: Night Fam-1 for wingman, plus *cat's-eyes.*

The story: Shortly after takeoff, the two F-4Js joined up, routinely proceeded to FL 200 and contacted the GCI site for ground controlled intercept practice. The wingman was on lead's port wing. After confirming position, identification, etc., of the flight, the GCI controller directed the lead aircraft to, "Come port to a heading of 360 degrees." The lead answered, "Roger," and broke *left* into his wingman. The RIO in the wingman's aircraft yelled, "Lookout! Lookout!" over the ICS to the pilot as he (the pilot) jerked the aircraft up to miss the lead aircraft which then passed underneath.

Back on the ground, the lead asked, "Didn't you see my signal? I wagged my wings and hand-signalled that I was going to pass under you."

Moral: Be sure your wingman understands all signals. Don't rely on hand signals in poor visibility conditions (in this case, dusk). And possibly, as a good rule, never, never break *into* your wingman. If nothing else, at least this rule will contribute immeasurably to the peace and contentment of your RIO. RIO MOUSE

To never break into your wingman should be an ironclad rule when you are in parade formation. There are times, however, especially during combat tactics when "breaking into your wingman" is standard procedure. That is to say, the wingman is in a combat cruise position, and prepared to stay out of the way of the leader. It goes without saying that the wingman should have been previously briefed on this position. The execution of a break into, or away from the wingman for that matter, should be preceded by a prebriefed signal (command) as well as a prebriefed signal to execute, e.g., "Standby to break left – BREAK NOW." The appropriate signal could also be

ANYMOUSE

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

given by hand, by lights, etc., but however it may be given, any maneuver as potentially disastrous as a break into your wingman should be the subject of a thorough brief – before the flight. – Ed.

Pretakeoff Checks

AN E-2A made a stop at NAS West Coast enroute to NAS Inland to pick up some parts to be delivered to a fighter squadron. After landing, the pilot kept both engines running while the parts were loaded aboard. The E-2A crewman assisted in the loading operation from inside the aircraft. When the loading was completed, the hatch was closed by the loading personnel outside the aircraft. When the pilot inquired of the crewmembers whether the hatch was closed, they replied in the affirmative.

Passing 8000 ft on climbout, the cabin pressure light illuminated. One of the crewmembers investigated and found the main hatch handle was not in the full up (locked) position.

The consequences of this incident are obvious; the hatch could have blown open in flight, or even been torn off, causing damage to the empennage. Whenever personnel unfamiliar with an aircraft close a hatch, the flight crew should physically check the hatch *locked* closed.

E-2A MOUSE

Amen! But don't limit the requirement for such checks to hatches. It applies equally to checking any work or operation performed by personnel who are unfamiliar with the aircraft. There are also benefits to be derived from giving your aircraft a good once-over whenever the opportunity presents itself, i.e., at intermediate stops enroute to destination. This fact is emphasized by another Anymouse, reprinted below:

A loose starboard vertical tail surface on an E-2A was discovered at NAS Destination following a cross-country flight from NAS West Coast. The discrepancy was discovered by maintenance personnel when the starboard wing failed to lock in place after folding.

The plane had made an enroute stop at NAS Halfway. The crew ate a quick lunch and refueled the plane. The pilot made a cursory preflight inspection, but failed to check the tail for integrity, as was his practice, and as he had done prior to taking off from NAS West Coast. Had he checked the tail at NAS Halfway, it is not known whether the discrepancy would have been discovered, but if it had, it's certain the aircraft would not have been flown to destination without further maintenance.

It is important to insure the safety of crew and passengers. The condition of the aircraft should be ascertained prior to all flights, including the second leg of a cross-country flight. The thoughts of tail separation at FL 290 are pretty frightening. *Preflight it!*

ANOTHER E-2A MOUSE

Amen! Amen!

Hook Confusion

I WAS plane commander flying copilot in an S-2E on our first night flight following an eight-month deployment. Since we had completed our scheduled exercises early, I suggested that we return to home field for some practice touch-and-go landings. The pilot agreed and we entered the pattern.

We landed fairly hard on the nose wheel the first time. Then when we lowered the gear for the next approach, the nose wheel indicated UNSAFE. We recycled the gear and then all three indicated DOWN-and-LOCKED. In the process of checking the wheels we had extended our downwind leg at 1000 ft and, thus would have a long final.

After completing the checkoff list I reviewed it and then, still being concerned about the momentary unsafe nose wheel indication we had received, I remembered that I had failed to have the tail hook bypass switch turned on prior to launch. I lowered the hook and asked the pilot to check the approach lights. After looking, the pilot assured me that he "...had a light" in the reflector on the engine nacelle. I then squeezed the hook handle and released it, feeling that the hook went UP.

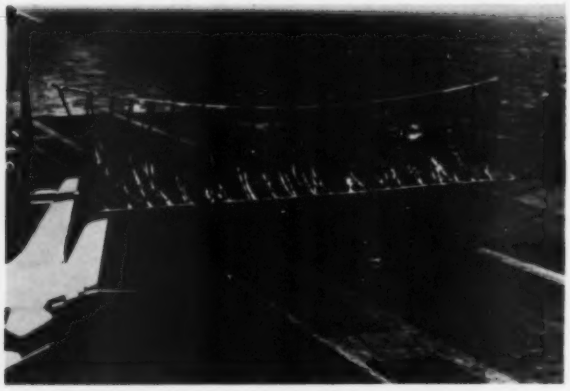
We continued the approach and requested a full stop landing. Touchdown and rollout were normal until, much to our surprise, the tailhook engaged the morest gear about 2000 ft down the runway. There was no damage to the aircraft but the field was closed until the morest could be reset. The wheels watch later told me he had seen the hook down as we passed overhead and had so informed the tower as quickly as possible by radio.

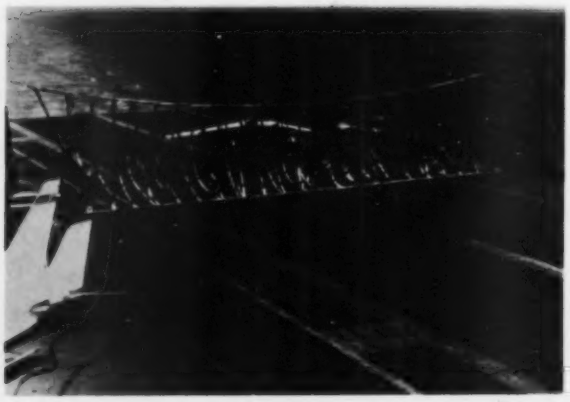
TRAPPED MOUSE

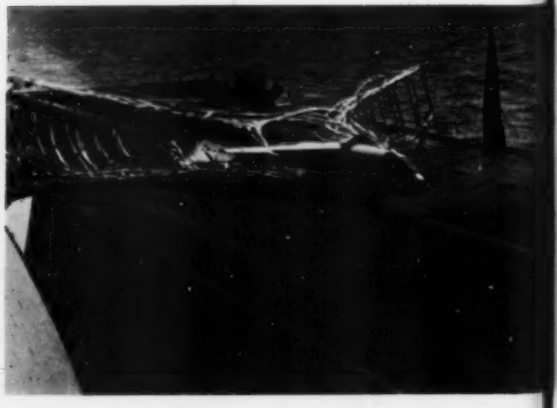
The approach light from outside the aircraft, or the attitude alignment light from inside the cockpit, are good indications that the landing gear are down and locked. Had the hook bypass switch been actuated prior to the flight, there should have been no need to lower the hook in order to use this system for a doublecheck.

This pilot was fortunate that the runway he chose was not equipped with chain type abort gear at the approach end. If this type of gear is engaged while proceeding in the wrong direction, it can cause extensive damage to the arrested aircraft. ◄

PhotoF







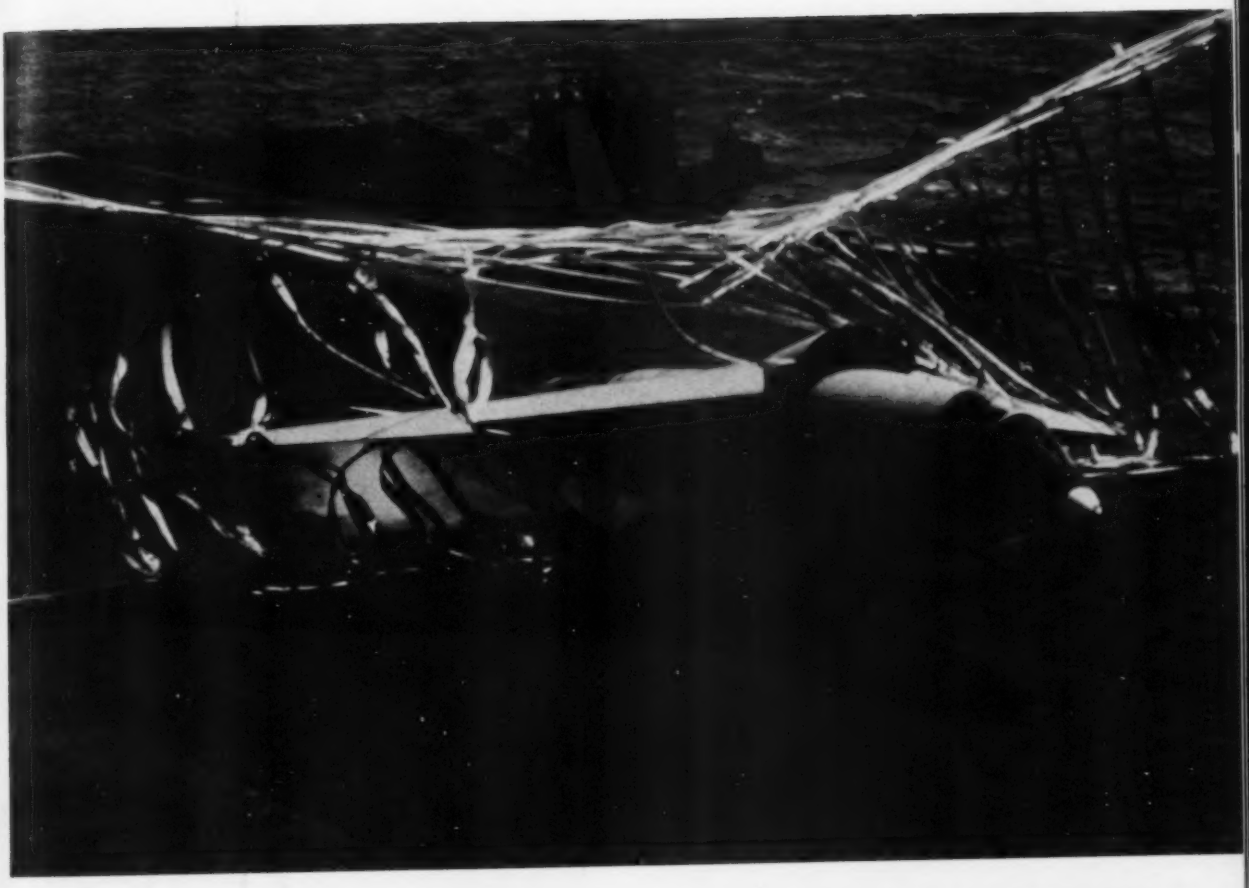
The young LTJG had completed an uneventful photo recon mission over North Vietnam in his RF-8G. On his approach to the ship he was slightly high, slightly fast in the groove. Upon touchdown, the port main gear failed and separated from the aircraft almost instantaneously. The hook skipped Nos. 3 and 4 cross-deck pendants and the pilot executed an uneventful bolter. The pilot was advised of the damage and of a planned barricade arrestment.

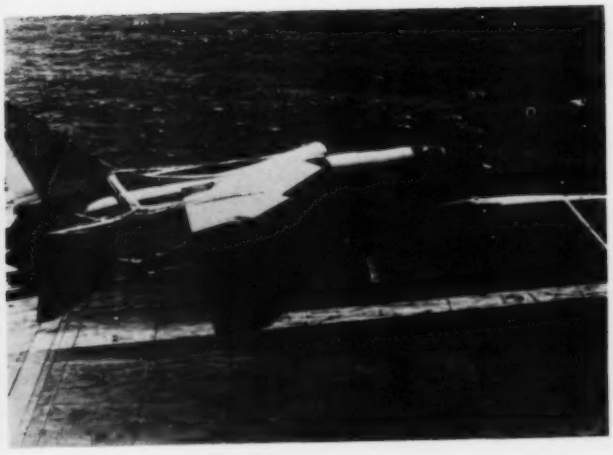
Recovery of other aircraft was completed and the barricade was rigged. Rigging was delayed about eight minutes because of air pressure problems. In the meantime, the pilot executed three passes to a waveoff.

The aircraft hydraulic lines were torn at the time of initial damage and utility pressure was lost, precluding use of the aerial refueling probe. With no chance to refuel, 800 lbs fuel remaining, the pilot settled down for the next pass. With glide slope information from the LSO and a good steady approach, the barricade arrestment was successful (see photos). After securing the engine, the pilot exited the aircraft without difficulty or injury.

A cool head, knowledge of procedures and teamwork combined to overcome the hazard created by a material failure of the landing gear, saving the pilot and a valuable aircraft.

oFinish!





I reached up to see if the face curtain would clear my helmet.

Up,

Up and Away!

WHEN an F-4B experienced an inflight electrical fire and power control hydraulic failure at sea, pilot and RIO ejected. Survival equipment – especially the new .38 caliber flare rounds – functioned well. However, the RIO found himself (for reasons he explains below) without his survival vest and radio for the first time since leaving the states.

We pick up the RIO's narrative as black smoke fills the cockpit and fire has broken out from the forward top part of the No. 1 circuit breaker panel.

"By this time the smoke was so thick that I could just barely see the instrument panel. I put my helmet visor down and tightened my oxygen mask. My eyes were watering from the smoke. I tried to lower my seat as I usually have it way up for better visibility but it wouldn't go down because of the lack of electrical power. I reached up to see if the face curtain would clear my helmet and decided it would, although barely.

"We had started our 360 degree turn at 5000 ft. I tried to read the altimeter but I couldn't even see the instrument panel now. By leaning forward and waving my hand back and forth, I cleared the smoke somewhat and saw we were at 3500 ft and descending slowly. I sat back in the seat and decided that if we continued to descend I would punch out at 2500 ft. Once again I tried to put the seat down without success. I leaned forward again to look at the altimeter but this time it was impossible to read it. Just as I was sitting back, I heard the pilot (either on ICS or yelling from the front cockpit) tell me something to the effect that I could get out when I felt like it. Well, I felt like it so I reached up and pulled the face curtain.

"I felt myself lift out of the cockpit – then there was windblast and a tumbling sensation. I did not feel seat separation, however. The next thing I remember was one heck of a jolt when the chute opened.

"After the chute opened I lifted my visor and watched the plane fly into a cloud. Then I took off my mask and, having disconnected it from the upper block, threw it away. The risers were very close together and I couldn't decide whether I was going to put my head in front or behind the risers. I finally put it in front so I could see the water better. Then I opened the seat pan and watched the bottom fall away and the raft inflate.

"It was at this time that I began telling myself how stupid I was for not having worn my survival vest with the radios in it. This was the first time that I had flown

without it since leaving the States several months before. I had been interrupted while putting on my flight gear and didn't remember the vest until I got out on the catwalk before manning the plane. Since we were already a little late, I decided not to go back after it. I wish I had because I had plenty of time to transmit on the way down.

"When I saw I was nearing the water, I put both index fingers on the koch fittings. (I had inflated my Mk-3C right after I deployed the raft.) As soon as my feet hit the water, I toppled forward onto my face. Immediately I released the chute; it sailed away about 15 to 20 ft and settled in the water. I looked behind me and there was my raft, right-side-up. I swam over to it and started to climb in. I was almost all the way in when I remembered that the seat pan was still strapped to my rear end. I plopped back into the water and took off the seat pan. Then I bellied into the raft again and sat up to take stock of the situation. I wasn't really worried about being picked up as I knew I wasn't more than 25 miles from the ship and had been under their control when we lost contact.

"I found that I had two day-night signal flares, my pistol with six of the new .38 cal. flare rounds in it and some dye marker. I threw out the sea anchor, even though the sea was quite calm, and pulled out my pistol. It was fairly difficult to get the pistol out because of the inflated Mk-3C. I shook as much water out of it as I could, pointed it in the air, turned my head and pulled the trigger. It worked. I feel that these new 38. cal. flares are really worthwhile because they go quite high and fall slowly. After this I put out my dye marker and swished it around.

"At this point I heard airplanes so I took off my helmet to hear them better. I put my pistol back in my holster. Then I looked behind me and saw a carrier only a few miles away. I lit off the day end of one of my signal flares in hopes that they would see the smoke; I saved the night end.

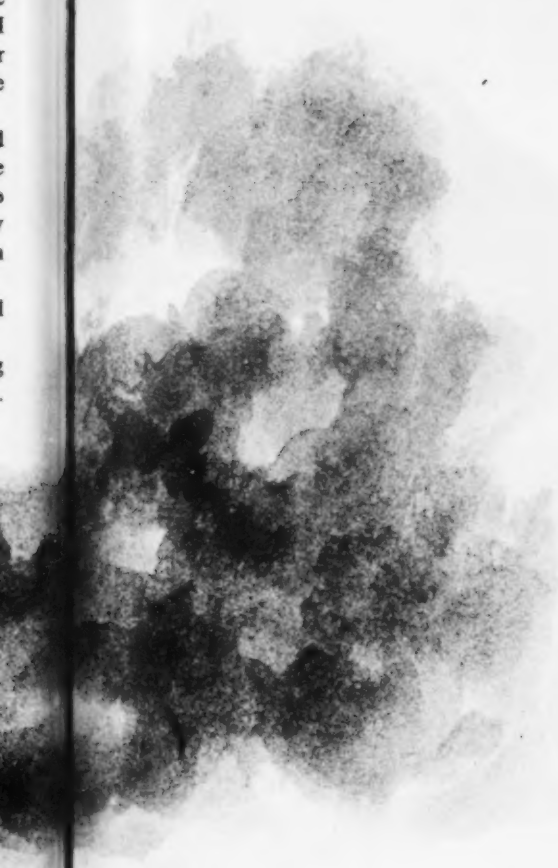
"After about five minutes, I took out my pistol again and fired about four more rounds toward the carrier. About this time I saw a helo lift off the deck and start my way. I tried to put my pistol in the holster again but because the Mk-3C was in the way, I either dropped it in the water or in the bottom of the raft. I lit the night end of the flare I had saved and tried to make smoke with it by dipping it in the water but this didn't work. (I'd heard somewhere you could do this but the flare burns as well under water as it does in air.) Just before the helo reached me, an S-2F came over. I lit the other day smoke signal to give the helo pilot wind direction and when he was about 50 yds from me, I bailed out of the raft.

"I gave the crewman a thumbs up to indicate that I was OK so he wouldn't come into the water with me, However, when the helo got over me, the crewman came into the water anyway and hooked me up. I was glad I had put my helmet back on when the helo came over because the spray was pretty bad. I was hoisted into the helo."

The SAR helo then proceeded farther upwind toward the area in which the crew had observed a second smoke flare. By this time the smoke had dissipated and the helo began a visual search of the area. Almost immediately they picked up the pilot's UHF beeper and homed in on it.

Now let's turn the clock back to the pilot's survival experiences beginning just after the RIO ejected:

"The control problems continued and I was heading for another large cloud so I took a vote," he begins.



"The ayes had it so I 'jumped.'

"After deciding to eject, I positioned myself in the seat and pulled the face curtain. The seat was all the way down or nearly so. The face curtain pull was very easy – so easy, in fact, that I did not notice the canopy jettison or the detent for seat ejection. The shock of the seat leaving the aircraft was also very easy. No unpleasant sensations were encountered until tumbling and chute opening. Tumbling and seat separation were very noticeable – slightly more than I had expected.

"My body must have been in a head down position when the chute opened. I assume this because the chute opening jerked me quite violently to the upright position and the right riser slapped my neck very sharply.

"Descent was very pleasant and uneventful. I opened my seat pan and deployed my raft which fell below me about 20 ft and inflated beautifully. Just before water entry, I crossed my legs and inflated one side of the Mk-3C. Water entry was just like jumping into a swimming pool from the diving board; there was little or no wind and my chute settled about 10 ft away. I released my koch fittings and swam over to my raft which was some 7 ft away. Upon reaching the raft I attached the restraining lanyard to my torso harness, unhooked my seat pan and climbed in. The only trouble I had with parachute lines was at this time; they tangled my feet and legs somewhat but, once in the raft, I easily removed them.

"I made myself comfortable and started to look around. I was about 3 miles away from some carrier. Taking my PRC-63 out, I turned the beeper on for a few minutes, broadcast two Maydays and then listened. I heard the ship calling '614, your signal is "Charlie" on arrival.' I broadcast another Mayday saying I was in the water. Our A-3 tanker came up and rogered my call and said he would relay it to the ship. I then began to unpack and examine my survival equipment.

"I took my pistol out and fired one of the new flare rounds to see how effective it was. I was very surprised; the flare rounds were quite effective. I then put my pistol back in the holster but failed to strap it in; between this time and helo pickup it was lost. *(Both pilot and RIO should have had lanyards on their pistols. Air Crew Systems Bulletin 157 refers. – Ed.)*

"About now the tower came up and asked me to light a flare. I did and they affirmed, 'Roger, we have you in sight and a helo's on the way.' From that time until the helo was overhead I sat in the raft and looked my survival equipment over and played with it. I used both the day and night ends of three flares. I also put out a dye marker which was very effective. Everything around me, even inside the raft, was yellow green in just a few minutes. About this time the helo arrived.

"As the helo approached, I lit another flare. The helo came to within 150 ft downwind. The crew told me over their loud speaker to leave my raft. I put my helmet on, lowered the visor, got into the water and started to swim away from the raft. The helo came in low overhead and one of their crewmen jumped into the water next to me. The helo then came back overhead and lowered a line. The crewman hooked us both to the same hook and we were hoisted aboard. We were then flown to the carrier."

SAR personnel commented afterwards that the .38 cal. special signal tip flare rounds were seen easily at ranges of 3 to 5 miles in light haze. The pilot's PRC-63 provided excellent communications in excess of 10 miles.

Both the pilot and RIO had attended a deep sea survival exercise within the past year. ◄

RUGGED RESCUE

The pilot, LT Clyde E. Lassen, was subsequently awarded the Medal of Honor.

DIFFICULT terrain, a dark overcast night, heavy enemy small arms and automatic weapons fire and continuous beeper transmission on the survivors' PRC-63 radios interfering with two-way communications were factors making the rescue of an F-4 crew extremely difficult. The SAR helo, a UH-2A, launched at 0022 to pick up the pilot and RIO who were down 60 miles from the ship and 20 miles inland.

"We launched at 0022, were given a vector and handed off to USS JOUETT for control," the pilot writes. "We were instructed to intercept the 260 degree radial at 10 miles from the ship and enter holding. Shortly thereafter we were told that Rescap had radio communications with the two survivors and a night overland rescue attempt was recommended. We were given a vector and altitude for crossing the beach and headed in. We went feet dry and switched to Guard."

"It was about this time," the copilot recalls, "that we identified a fire ahead as the burning wreckage of the downed aircraft and received a steer from Rescap to the survivors in relation to the fire. They were located on the side of a small hill, flanked by many villages and rice paddies to the north, south and east and a small mountain range to the west. There were also scattered trees and brushwood around the base of the hill extending into the rice paddies and a one-lane road connecting the villages. We established voice communications with the survivors and began a high speed spiraling descent for the search and pick up. I first noticed ground fire at this time, judging it to be only small arms."

"The survivors were about half way up a rather steep, heavily wooded hill with numerous tall trees around their location," the pilot continues. "While waiting for Rescap to light their position with flares, visual contact with the survivors was lost and again we requested and received a pistol flare from the survivors. We informed the survivors that we had sighted their position and would land approximately 200 ft directly downhill. I made an approach and landed in a rice paddy. As soon as we were on the ground we began receiving small arms fire and some automatic weapons fire. The survivors stated they couldn't get down the hill so I lifted and made a couple of orbits overhead.

"The survivors kept saying 'Come get us, come get us!' We could not get them to turn off their PRC-63 radios and consequently they could not hear us while they were transmitting." (The pilot's Rescue Report states that he was unable to communicate with the survivors because their PRC-63s were on beeper. When the PRC-63 is on and neither the transmit or receive button is pressed, it automatically transmits a beeper signal interfering with two-way communications.)

"With the survivors, crewman and copilot giving me directions, I made a partial instrument, partial contact approach to about 100 to 200 ft over the survivors. Flares dropped by Rescap lighted the area well at this time. The survivors' position was between two large trees. I made the approach to a 50 ft hover between the trees which were approximately 150 ft apart. As the crewman was lowering the rescue sling, the flares went out and it became pitch dark again. I lost sight of the survivors and had no visual reference.

"The crewman yelled that we were going to hit a tree. I added power and was just starting a climb when I hit the tree just aft of the first crewman's position. I felt a large jolt. The helo pitched down and went into a tight starboard turn. I regained control and waved off. We informed Rescap that we had struck a tree and had a fairly heavy vibration. We requested more flares and were told that no more were available but that some were on the way. I again informed the survivors they would have to come down off the hill into the clearing."

The copilot pays high tribute to the pilot's performance in this crisis. His spontaneous, expert airmanship, he said, was the only factor saving them from crashing.

"We had been receiving small arms fire since arriving in the area," the pilot continues. "The fire became progressively worse as we waited. At this time we were under heavy small arms fire and, occasionally, automatic weapons fire. I thought of calling in Rescap for fire suppression but the fire was scattered from all directions and not concentrated in any one area. The area in which we were orbiting was composed of rice paddies, a village and a wide one-lane road. The 5 to 10 minutes without illumination was spent returning hostile fire and trying to keep the survivors' position in sight.

"Rescap arrived with additional flares and began dropping them right in the spot we requested. While circling we tried to persuade the survivors to come down off the hill. We finally got good two-way communications and the survivors said they were coming down. I made another approach and a second landing. The survivors said we were too far away from their position so I launched again.

"At this time we were down to 30 minutes' fuel. We had been in the immediate area of the survivors for 45 minutes and we were now under heavy fire. My crewmen were returning the fire from both sides of the helo. The copilot was also firing from his window. The survivors said they were at the bottom of the hill and could hear people moving in around them and we had better hurry.

"I commenced another approach. When passing their 180 position at approximately 2000 ft, a ball of flame about 6 inches in diameter passed a few feet under the

helo at a high speed. As we rolled on final, automatic weapons fire opened up from a position just a few hundred yards south of the survivors. When we were at approximately 50 ft, the flare overhead went out and I had to turn on the spotlight to land. We came under heavy fire the minute the light was turned on.

"We touched down in a marshy area and I had to hold the collective up to keep us from sinking. During the two minutes it took the survivors to reach the helo, we were under continuous fire. The crewman and copilot did an excellent job in suppressing the fire long enough for the survivors to reach the helo.

"After both survivors were aboard, we departed, climbed and headed toward the sea. One of the survivor's radios was still on and was overriding my UHF so that I couldn't receive transmissions from Rescap."

A survival radio lost on the ground was also beeping in addition to the survivor pilot's radio in the cabin. When the survivor's beeper was secured, the helo crew was able to receive a vector to the coast.

"As we neared the coast, we started receiving flack and heavy caliber automatic fire from the coastal defense sites," the pilot's report concludes. "It was bursting at our same altitude so we entered a descent. The starboard door would not completely close and was torn from the helo and lost. I kept the airspeed at 150 kts until we were feet wet. We landed aboard at approximately 0230 with 135 lbs of fuel remaining.

"The support from Rescap in vectoring us to the survivors, steering us around the flack and missile sites, dropping flares right on target each time and the moral support they gave us in just knowing they were there definitely contributed to making the rescue a success.

"We were feet dry for 58 minutes. For approximately 50 minutes of this time we were receiving heavy but inaccurate small arms and automatic weapons fire. I attribute our good luck at not being hit to the dark overcast night. We were flying without lights and did not give our position away by random firing. I believe the enemy was firing at the sound of the helo but could not see our position. I do not believe this rescue could have been performed during daylight because of the populated area in which the survivors landed and the heavy concentration of small arms fire in the area."

Among the pilot's remarks in his Rescue Report was that the survivors' magnesium 38 cal. tracers were an excellent means of locating survivors in the dense jungle.

The pilot credits the success of the SAR mission to two interdependent factors: *training* – training received at HC-7, specialized combat air crew-pilot training at Cubi Point, hours spent in night proficiency training prior to deployment – *and teamwork.*

Lieutenant Clyde E. Lassen
United States Navy

for service as set forth in the following

Citation:

For conspicuous gallantry and intrepidity at the risk of his life above and beyond the call of duty on 19 June 1968 as pilot and aircraft commander of a search and rescue helicopter, attached to Helicopter Support Squadron SEVEN, Detachment ONE HUNDRED FOUR, embarked in USS PREBLE (DLG-15), during operations against enemy forces in North Vietnam. Launched shortly after midnight to attempt the rescue of two downed aviators, Lieutenant (then Lieutenant, Junior Grade) Lassen skillfully piloted his aircraft over unknown and hostile terrain to a steep, tree-covered hill on which the survivors had been located. Although enemy fire was being directed at the helicopter, he initially landed in a clear area near the base of the hill, but, due to the dense undergrowth, the survivors could not reach the helicopter. With the aid of flare illumination, Lieutenant Lassen successfully accomplished a hover between two trees at the survivors' position. Illumination was abruptly lost as the last of the flares were expended, and the helicopter collided with a tree, commencing a sharp descent. Expertly righting his aircraft and maneuvering clear, Lieutenant Lassen remained in the area, determined to make another rescue attempt, and encouraged the downed aviators while awaiting resumption of flare illumination. After another unsuccessful, illuminated rescue attempt, and with his fuel dangerously low and his aircraft significantly damaged, he launched again and commenced another approach in the face of the continuing enemy opposition. When flare illumination was again lost, Lieutenant Lassen, fully aware of the dangers in clearly revealing his position to the enemy, turned on his landing lights and completed the landing. On this attempt, the survivors were able to make their way to the helicopter. En route to the coast, Lieutenant Lassen encountered and successfully evaded additional hostile antiaircraft fire and, with fuel for only five minutes of flight remaining, landed safely aboard USS JOUETT (DLG-29). His courageous and daring actions, determination, and extraordinary airmanship in the face of great risk sustain and enhance the finest traditions of the United States Naval Service.

Without Protection

THE rear cylinder assembly of a 1980-S aircraft jack failed while it was being used to replace the port main wheel on an A-6A. The new tire was partially installed on the axle when the failure occurred. The cylinder exploded striking the underside of the port engine access door. The aircraft fell on the partially installed tire, pinning the feet of a maintenance troubleshooter to the flight deck. His right foot was freed by rocking the aircraft and his left foot by unlacing the shoe.

The maintenance trouble shooter sustained minor injury. He was not wearing safety shoes. He had been issued a pair but did not wear them because he mistakenly thought the protective cap would collapse if subjected to a heavy weight.

Safety shoes here would have most likely prevented injury completely.

(See next item. – Ed.)

With Protection

IN an attempt to expedite manning the aircraft, a pilot was preflighting an F-4B while it was temporarily halted on the flight deck. It was after dark and the respot was incomplete due to the length of the preceding recovery. Neither the director or the tractor driver was aware of the pilot's presence and subsequently moved the aircraft without ascertaining if it was clear. The pilot was exiting the right wheel well when the aircraft was towed forward over his foot. His foot and toes were severely bruised but the steel-toed flight boot prevented more serious injury (see photo).

"It is an outstanding testimonial to the steel-toed flight boot that the injury was not nearly as serious as was possible," the squadron safety officer wrote in his report.

"Concur fully," the squadron C.O. commented. "Preflight inspection and possibly the manning of aircraft may be necessary prior to final respot when the respot has been delayed. In such situations, crewmembers are called on to exercise a challenging admixture of aggressiveness and caution."

notes from your flight surgeon

Ear Protection

IN ADDITION to inserting ear plugs prior to going into the vicinity of an APU, personnel who will be around the APU should also use sound attenuators ("Mickey Mouse" headsets). Each aircraft has five headsets stowed at the aft end of the sono rack. Ear plugs are not adequate to prevent ear damage when in close proximity to the APU as during preflight of the exterior.

VP Safety Council

Lifesaving

PILOT and copilot for a routine cross country flight had not known each other previously. Since the copilot, who had recently returned from Viet Nam, had never flown the T-1A, the pilot carefully reviewed with him preflight procedures, fuel procedures and emergency procedures, including the operation of the ejection seat.

Eight miles from touchdown the pilot noted fuel down to 800 lbs. Fuel loss became excessive and three-fourths of a mile short of the runway the aircraft flamed out at slightly over 1000 ft. On command the copilot ejected followed by the pilot.

"It is refreshing to note the thoroughness with which the pilot briefed his copilot in the operation of the aircraft and in emergency procedures," the investigating flight surgeon reports. "It does not seem unreasonable to speculate that this briefing may have had great significance in their ultimate survival . . . careful preflight briefing and emergency procedures can be, as it was in this case, lifesaving."

It's Gonna Get Hot!

Here's some hot weather advice from The Professional written for the men of the 1st Marine Air Wing. These guidelines are equally applicable to high temperature and humidity conditions in ConUS.

WITH the coming of the southwest monsoon, temperatures in "Eye" Corps are going to put a strain on the old thermometer. Temperatures above 100^0 are going to be the rule rather than the exception. This very hot weather is going to require a few changes in our daily routine, particularly our eating and drinking habits.

The human body contains a great deal of water and a considerable amount of salt. Sweating causes the body to lose these items and they must be replaced. The body cannot be weaned away from water or trained to do without salt. You have got to increase your intake of both to satisfy your body's requirements. Here are a few guidelines to help you keep a good salt and water balance during the summer and to avoid heat injury and exhaustion.

- *Drink water frequently and drink as much as you need. Small quantities of water taken frequently will satisfy your desire and will avoid that stuffed feeling that too much water taken at one time can cause.*
- *If you are sweating freely avoid cold drinks. They may taste great going down but will lie like a rock in your stomach. Cool drinks, not cold, will help avoid cramps and chills.*
- *Eat lightly. Go easy on sweets. Substitute water and fruit juices for soft drinks and milk occasionally.*
- *Take salt tablets if you can't satisfy your need for salt by using a greater amount on your food. Don't take too many all at once. Overdoses of salt tablets can cause nausea, diarrhea and vomiting. Space them out over the course of the day.*
- *Keep your headgear on in the sun and remember that a loose layer of clothing will actually keep out some of the sun's heat.*
- *If you feel sick or dizzy when heated, take a break. Let your body cool itself. Don't overdo things.*
- *If you stop sweating, get prompt medical aid.*

Your friendly flight surgeon will be delighted to chat with you about hot weather problems, salt tablets and your summertime drinking habits. Look him up!

The Professional

Rotates

THE PILOT of an F-4B wore his helmet chin strap loose. On ejection at 150 kts, parachute deployment was violent, rotating the helmet and attached oxygen mask up and back over his eyes. He pulled them off during descent and threw them away.

Flight surgeon's comments: The pilot's helmet chin strap was loose, resulting in the shifting of his headgear on this relatively low speed ejection and chute deployment. The importance of having a snug-fitting chin strap, especially in high velocity ejections, should be made clear. *Amen! – Ed.*

A Real Approach to FOD Prevention

By John B. Crocker
and
William Strong
NASCRePac Field Service
NAS Miramar

Some revealing facts on runway sweeping.

Did You Know:

- That a master jet base contains 12,670,000 sq ft of sweeping area?
- That this area includes not only the runways but taxiways, service ramps, aircraft parking areas and refueling pits?
- That if this area was formed into a rectangle 6 ft wide it would be 400 miles long?
- That at 5 mph it would take a sweeper 80 hours to sweep this distance?
- That this would take one driver and one sweeper two work weeks (80 hours) to sweep the area once?
- That at this rate the station is swept only twice a month?
- That such practices are wholly insufficient to cope with the FOD problem?

Airfield vacuum sweeper does its best under 15 mph.

THESE and other facts were uncovered at NAS Miramar during a 12-month study and observation of FOD prevention efforts by the authors. These are passed along here for the benefit of other stations that have not been getting the most out of their sweeper capability.

First, let's review the type of FOD most commonly experienced. Hardware is the worst kind but it is most easily detected and identified. For instance, an inspection of a compressor damaged by a small bolt or screw will reveal thread imprints, a nut will leave a triangular indentation, a tool or heavy object will tear the blades. Items such as these are in most cases the result of leaving them in the air ducts during maintenance. Helmets, safety pins and mickey mouse hearing protectors are usually ingested when brought into the proximity of the air intakes by people.

While a large percentage of engines are turned in for this type FOD, a larger percentage, not found on routine inspections, is discovered on engine teardown. FOD of this kind is attributable mostly to pea gravel, grit, ice, concrete chips, sand, blacktop aggregate and the like. This type of foreign object is ingested during engine operation. But, contrary to popular thinking, jet suction alone rarely picks up small objects from the ground. Tests reveal that foreign objects on the ground need help to get into jet intake vortices, such as dislodging from resting places by jet or prop blast or wind-over-deck. Hence this approach to the sweeping problem.

Although sweepers are capable of speeds of 25 mph, their most efficient speed is around 15 mph. This average cannot be maintained in congested areas such as parking ramps and fuel pits and allowing for sharp turns in other

An F-8, with nosewheel depressed, at 100 percent power proved that objects on deck need help to get sucked in.

areas, a speed of 5 mph is a more realistic average.

It was determined that three sweepers, all in an up condition could do the job by sweeping at the right time. But until we analyzed our sweeper utility we were only getting an average of 8 sweeper hours per day, 6 days per week for a total of 48 hours a week from all three sweepers combined. This was due mainly to inadequate scheduling of operators, designation of sweeping areas and sweeping times.

Operations and Public Works instructions were reviewed. We found that an attempt was being made to sweep the total runway daily and that this effort was consuming 70 percent of the operator-machine hours and that other areas were left to the discretion of operators – if it looks dirty, sweep it. There were no clearcut definitions of sweeping areas or operators' duties. Operations' prime interest was centered on runways and taxiways. We learned that we were overdoing these areas at the expense of FOD potential-prone areas.

It was determined by analyzing the sweepings, type of operation in various areas and the findings, that FOD potential was greatest in:

1. High speed fuel (hot refueling) pits.
2. Turnup areas (awaiting takeoff).
3. First 1500 ft of the runway (either end, depending on prevailing winds).
4. Taxiways.

At this point we want to make it clear that parking, service and maintenance aprons are not mentioned because these are not considered practical sweeper areas. Congested, under-aircraft areas are still walkdown and pickup areas. Mechanized sweepers rarely have access to these areas but if possible these should be swept.

Hi-Speed Hot Refuel Area

Analysis of sweepings in this area revealed that in 80 lbs of material, 60 percent was grit, dirt or sand. Pea gravel, cement chips or small rocks made up 30 percent; metal screws, nuts, bits of wire and tabs from soft drink cans, 5 percent; and paper, pencils, cigarette butts, weeds and textile material, 5 percent. Operational practices involve the taxiing of aircraft into fueling spots and parking abreast of each other with engines running. When one aircraft completes refueling it taxis out with about 80 percent power, initially, to get rolling. Jet blast starts objects into motion which then can be easily ingested by aircraft still being fueled.

It was noted that this area also had the highest concentration of vehicle movement such as service vehicles carrying people to and from jobs and fire trucks hosing down fuel spills. Consequently, a lot of foreign object track-in by tires of the vehicles and debris from truck beds finds its way into this area.

Takeoff Turnup Area

This area has a similar problem of having one aircraft blasting into another and the possibility of starting objects in motion. Although a lesser concentration of foreign objects was found here due to the sweeping action of jet or prop blast, it must be considered a high

FOD-potential area because of the concentration of aircraft and high power used.

Runway Areas

Analysis of sweepings from runways indicated very little FOD potential in that 95 percent was sand and dust, 2 percent gravel, 2 percent leaves, weeds or paper and 1 percent metal. Of the metal objects, most were too large to be sucked up but could be a tire hazard. Periodic walkdowns are the best solution to cope with this problem. Some of the metal was identified as cowl fasteners or access plate fasteners which were not properly fastened and shaken off by landing impacts on the first 1500 ft of the runway.

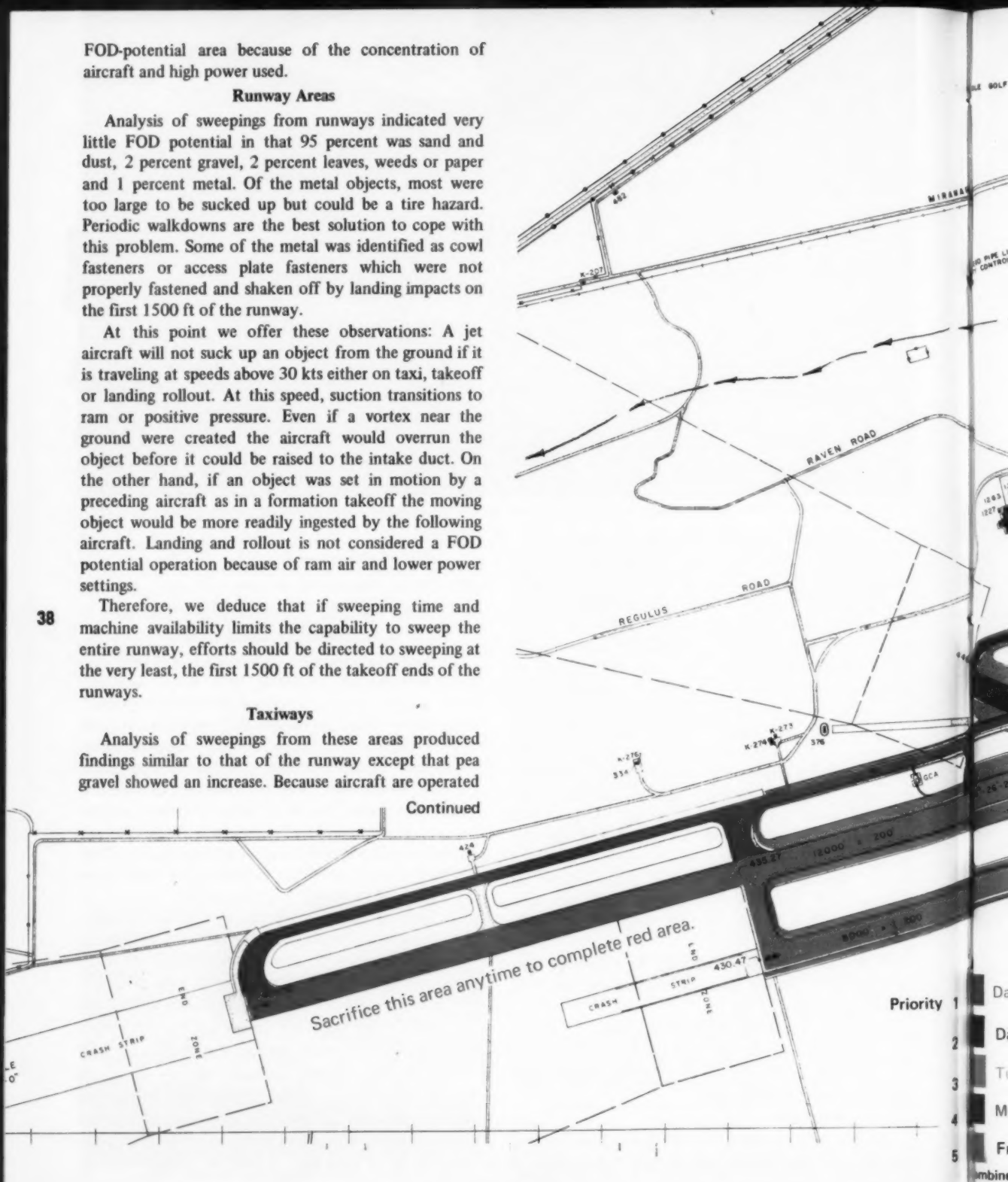
At this point we offer these observations: A jet aircraft will not suck up an object from the ground if it is traveling at speeds above 30 kts either on taxi, takeoff or landing rollout. At this speed, suction transitions to ram or positive pressure. Even if a vortex near the ground were created the aircraft would overrun the object before it could be raised to the intake duct. On the other hand, if an object was set in motion by a preceding aircraft as in a formation takeoff the moving object would be more readily ingested by the following aircraft. Landing and rollout is not considered a FOD potential operation because of ram air and lower power settings.

Therefore, we deduce that if sweeping time and machine availability limits the capability to sweep the entire runway, efforts should be directed to sweeping at the very least, the first 1500 ft of the takeoff ends of the runways.

Taxiways

Analysis of sweepings from these areas produced findings similar to that of the runway except that pea gravel showed an increase. Because aircraft are operated

Continued



Daily	2130 to 0230
Daily	0600 to 1430
Tues.-Thurs.	0300 to 0600
Mon.-Wed.	0300 to 0600
Fri.	0600 to 1430

mbine with adjacent color area when possible.

here at relatively low power settings and taxiing is not close to preceeding aircraft we rate this area as the fourth most probable source of FOD.

In our efforts to define our FOD control problem we arrived at these conclusions:

1. Not all FOD is mechanic-induced.
2. That the ability of jets to vacuum objects from operating surfaces was not fully understood.
3. That jet engines are most vulnerable when subjected to prop and jet blast.
4. That pea gravel (debris) will be introduced into operating areas through normal operating practices; prevention is practically impossible.
5. That total sweeping daily of operational areas could not be achieved.
6. That proper equipment is available to prevent accumulation of debris.
7. That this equipment is not efficiently used.
8. There is a lack of definition and plan as to what, where and when airfield sweeping is required.

Item 8 was recognized as the crux of the problem and we organized around items 1 through 7.

We approached a planned sweeping program by color-coding a station map, (see illustration, pages 38, 39) showing the high-potential FOD areas. By establishing that progression of debris is from the service area to the airfield we concentrated sweeping in maintenance, parking and service (blue) areas to reduce progression to the fuel pit, turnup and runway (red) areas where it is most likely to be ingested.

The red area was considered the most essential; the blue area, second. We combined these for daily sweeping. Using a square foot to mileage computation and allowing for obstructions and turns, we determined that 61 sweeper hours were needed per week to sweep these areas daily. At a speed of 15 mph the first 1500 ft of runway could be swept in 3 hours – between 2300 and 0200 when field operations were at a minimum.

Daylight hours were used in congested parking and fuel pit areas where visibility was needed to obtain a higher sweeper speed. Our planning was aimed at bringing the sweeper speed close to an average of 15 mph in order to obtain optimum manpower-sweeper efficiency. By scheduling the bulk of sweeping at night we always have two sweepers available for maintenance or emergency sweeping during the day.

Sweeper operators were indoctrinated in the importance of their job. They were shown FOD'd engines, the effect of damage, safety aspects and costs to repair damaged engines. They were instructed to use the sweeper blower even on roadways to and from the airfield – foreign objects there tend to find a way to the airfield – also to use a different access to the field each time to help prevent gravel progression to that area.

A copy of the colored (zoned) map is posted in the cab of each sweeper and a log book used to record daily sweeper mileage and blower hours per shift. If for some reason an operator cannot accomplish his assignment, the reason and area is logged accordingly. Public Works supervisors review this daily and then can plan a pickup of the missed area. Each sweeper is radio-controlled on tower frequency.

This is the Miramar program. It looks practical and promising. In short, sweep you must, but – sweep where it will do the most good! ◄

Feed not into the engines

items which are difficult to

convert into forward thrust.

Follow These Rules, Aviators, If You Want to Arrive Safely

AS a service to pilots, APPROACH reprints the following list of flight safety rules, which originally appeared in the U.S. Air Service Newsletter.

1. Don't take the machine into the air unless you are satisfied it will fly.
2. Never leave the ground with the motor leaking.
3. Don't turn sharply when taxiing. Instead of turning short, have someone lift the tail around.
4. In taking off, look at the ground and the air.
5. Never get out of a machine with the motor running until the pilot relieving you can reach the engine controls.
6. Pilots should carry hankies in a handy position to wipe off goggles.
7. Riding on the steps, wings or tail of a machine is prohibited.
8. In case the engine fails on takeoff, land straight ahead regardless of obstacles.
9. No machine must taxi faster than a man can walk.
10. Do not trust altitude instruments.
11. Learn to gage altitude, especially on landing.
12. If you see another machine near you, get out of its way.
13. No two cadets should ever ride together in the same machine.
14. Never run the motor so that blast will blow on other machines.
15. Before you begin a landing glide, see that no machines are under you.
16. Hedge-hopping will not be tolerated.
17. No spins on back or tail slides will be indulged in as they unnecessarily strain the machine.
18. If flying against the wind, and you wish to turn and fly with the wind, don't make a sharp turn near the ground. You might crash.
19. Motors have been known to stop during a long glide. If the pilot wishes to use the motor for landing, he should open the throttle.
20. Don't attempt to force machines onto the ground with more than flying speed. The result is bouncing and ricocheting.
21. Pilots will not wear spurs while flying.
22. Do not use aeronautical gasoline in cars and motorcycles.
23. You must not take off or land closer than 50 ft to the hangar.
24. Never take a machine into the air until you are familiar with its controls and instruments.
25. If an emergency occurs while flying, land as soon as possible.

We forgot to mention that this particular newsletter was dated 2 Jan 1920.

Any pilot planning to haul external loads must be familiar with the NATOPS manual for his helicopter. He must know load limitations, airspeed limitations, performance data and operation of the sling and its release mechanism.

External Loads

HAULING cargo by helicopters is the order of the day. Vertical replenishment is conducted every day between ships throughout the world as well as resupply missions between stock points and troops in the field in Vietnam. Amphibious assault procedures depend on the fast delivery of troops and supplies which is made possible by the quick response and increased carrying capacity of present day helicopters. Whenever tactics dictate an end-around maneuver, invariably troops are helo-lifted to new assault positions; then the business of supply and resupply is continued by helicopters. Evacuation of wounded and injured troops by chopper has markedly decreased the number of fatalities. Recovery of downed helicopters and fixed wing planes by other helicopters has saved weapons systems which otherwise would have to be abandoned or destroyed. The ease and speed with which outsized loads are handled by helicopters saves untold hours and effort. The flexibility which the helicopter provides is insurance without which on-time amphibious operations could not be conducted.

In the present helicopter inventory there are great differences in cargo carrying capacities. Figure 1 indicates, in general, some rule-of-thumb figures. As is evident from the values shown, cargo carrying capacity (and delivery speeds as well) has greatly improved since the introduction of the CH-46D and the CH-53A. Not too long ago amphibious commanders were concerned about the time it took helicopters to get supplies to the beach. Now, with increased load carrying capacities, helicopters occasionally wait for cargo teams to strike up supplies and material from the holds. Prepositioning has helped to some degree but faster methods and improved material handling equipment are needed to keep pace with the improvements in helicopter load carrying capacities.

Model	Cargo Hook Capacity	General Load Capacity	Limiting Eng. Torque
UH-2C	4000	1600	50 %
UH-34D	5000	1250	48 in MAP
RH-3A	6000	3500	86 %
CH-46D	10,000	6000	86 %
CH-53A	20,000	12,000	94 %

Fig. 1

(Information received from Rotary Wing Branch, Pax River; MAG-26, New River; HC-6, Norfolk; and HMM-561, Santa Ana. None of the information given is intended to take the place of values set forth in the appropriate NATOPS manual for each model. The table is shown to illustrate the differences between models only.)

One dark cloud on this otherwise bright horizon is the concern, mounting at all levels, with the frequent inadvertent loss of external loads. *"Crossfeed"* issues for November and December 1968 list repeated unintentional drops by UH-34s, CH-46s and CH-53s. These three models are being used almost exclusively to perform vertical replenishments in the fleet and S.E. Asia. The main reasons for these losses are centered around failure or malfunction of three pieces of hardware; namely, slings, cables and pendants. The most common error causing these failures is improper hookup.

Ordinary care in hookups is insufficient. If improper hookups can be eliminated the number of instances of dropped loads would be greatly reduced. A much greater loss of loads occurs when the hookups are made by shipboard and battalion personnel rather than by support personnel attached to aviation units. The examples which follow are used to illustrate dropped loads for various reasons.

A UH-34 dropped an 800 lb load. The load was picked up by another UH-34 and was again dropped. The same load was improperly hooked up twice – by the same crew.

A CH-46 dropped a 5000 lb load when a steel cable parted. Personnel improperly rigged the load with the cable loop over the aircraft hook allowing twisting which caused the cable to part.

A CH-53 carrying a load of ammunition lost one of several pallets from the cargo net. It is suspected that the net was improperly rigged.

In the examples cited, as in most cases, the load was not rigged properly. Contributing to the problem of inadvertent release of external loads is improper care of equipment. Neglect and improper stowage of nets, slings and straps takes its toll. Wherever possible these pieces of equipment should not be stacked or allowed to get wet, soaked with gas and oil or crushed under piles of supplies. Many incidents have been reported where deterioration of cargo equipment has caused loss of loads. Nets have split, straps have broken and slings have separated and the only explanation seems to be that the material had been mistreated.

Another consideration is the ability of the pilot to jettison the load if it becomes unmanageable or if a power plant failure or other emergency occurs making further flight impossible with an external load. The pilot is completely dependent on the hookup crew to do the job correctly. He *must* be able to jettison the load if he encounters an emergency.

One final consideration to reduce dropped loads rests with the pilots. A review of a few axioms in carrying external loads is worth repeating.

- Smooth handling of controls is absolutely necessary.
- Takeoffs should be in a flat attitude so that most of the power can be transmitted into lift rather than into forward thrust.
- Hauling speeds should usually be lower than normal cruise speeds.
- The lighter the load, the slower the flight.
- Try to control load oscillations immediately – usually by slowing down.
- Know your helicopter and know what loads you can carry for any given combination of helicopter weight, altitude, temperature and wind.

Which One Would You Feather?

THE SQUADRON had four nights in which to get five pilots ready for initial night carquals in the E-2A. Since two of the four squadron aircraft were in PAR, aircraft and time were both at a minimum.

The pilots checked yellow sheets, preflighted and manned aircraft without any complications. After flying to an outlying field approximately 100 miles away, the plane made a full stop landing to discharge the extra pilots before beginning the bounce period.

The first period was uneventful but after two passes with the second "Nugget," the plane commander noted that the port tachometer was behaving erratically. Because of limited time, few aircraft and the operational commitment, coupled with the fact that all other instruments were normal, the plane commander elected to continue the hop.

After four passes, the 2P and plane commander were feeling as secure as one can feel when approaching the 90-degree position on a pitch black night at 300 ft, with desert thermals and 30 kts of gusty wind. All of a sudden . . . . as the old pilot saying goes, there was a hot acrid smell, a banging noise and flashing lights in the vicinity of the engines – all symptomatic of engine trouble.

While the 2P added full power and raised the gear, the plane commander tried to ascertain which engine was bad. He noted the port tachometer was reading 20 percent and as you know, that isn't good. Resisting a powerful urge to feather the port engine, the plane commander checked the starboard engine tachometer and noted that it was rapidly unwinding. After a moment of reflection during which he recalled the earlier trouble – erratic tachometer readings – on the left engine, the plane commander decided his best bet was to feather the starboard engine. Although the aircraft got a little slow and low, the pilots were cheered by the steady drone of the port engine as it continued to put out full power.

It would be hard to criticize the plane commander had he punched out the port engine; however, his refusal to jump to conclusions saved the day and demonstrated once again that it pays to keep cool.

Which one would you have feathered?

Submitted by LTJG Chuck Long

Don't panic! Keep cool! That is the lesson inherent in this narrative. It is a good lesson and should be heeded; however, it seems there is another lesson to be garnered from this incident. Whenever a malfunction of equipment occurs, it often calls for the finest discrimination on the part of the pilot. A seemingly minor casualty can often degrade the pilot's future capability and that's where the discrimination comes in. The pilot must give close attention to any malfunction and come up with the optimum course of action while at the same time giving due weight to many variables. – Ed. ◄

MURPHY'S LAW *

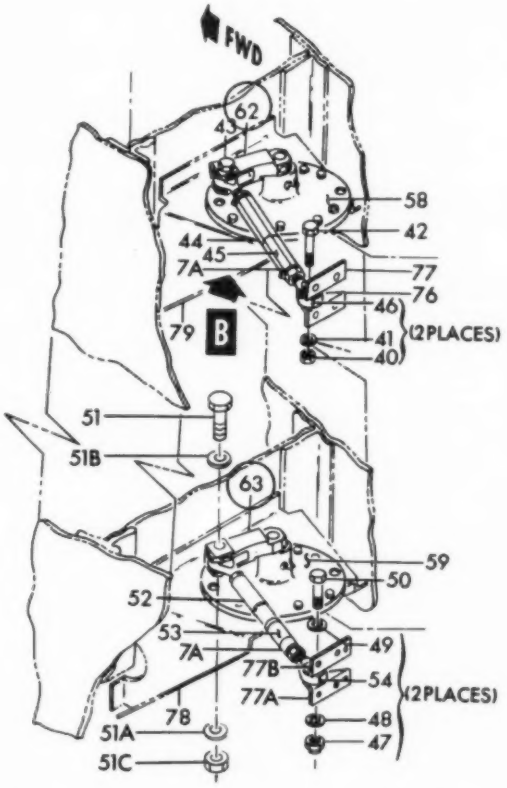
P-3 Viscous Damper Murphy

WHILE adjusting the P-3's rudder pedals in flight, the pilot noticed the pedals had jammed in the full forward position. Upon landing, attempts were made to free the pedals by operating the rudder to full throw, right and left. The rudder jammed full left momentarily but broke free. Inspection revealed that the arm on the bottom rudder viscous damper was scored and the damper arm was damaged.

A check of the part number on the bottom viscous damper revealed that an upper arm was installed on the lower damper. The upper arm is 1/4-inch shorter which allowed the connecting rod to go past dead center in the full left rudder position which reversed the direction of travel for the viscous damper. This caused the connecting rod to crush the guard and to jam the pedals.

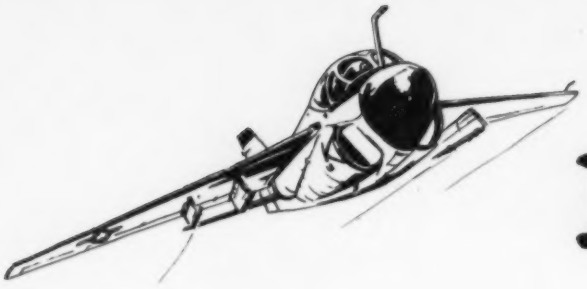
An inspection of all squadron aircraft revealed that on one other aircraft recently received from PAR, the viscous damper arms were *reversed*, that is, the lower arm was on top and the upper arm on the bottom.

P-3 operators are advised to be on the alert for the possibility of this potential maintenance error, particularly when the damper assembly is worked on. ◄



Upper arm, item 62, is 1/4-inch shorter than lower arm, item 63, and therefore not interchangeable.

* If an aircraft part can be installed incorrectly, someone will install it that way!



Letters

EAC or EFC

Pensacola, Fla. – The answer to the first question on page 23 of the January 1969 APPROACH is wrong. If holding is required at any place other than the initial approach fix you should be given "expect further clearance time" vice "expect approach clearance time." If by error you were given and accepted "expected approach clearance time" you should plan to leave the holding fix in order to arrive over the fix from which the approach begins as close as possible to the expected approach clearance time. The right answer is – "don't accept an approach clearance time unless the holding pattern depicted is at the fix at which the approach commences."

CDR M. C. Drees
Training Squadron TEN

• The answer to the question on page 23 of the January 1969 issue has generated considerable interest and discussions have revealed that many different interpretations and applications are being utilized. Many of the inquiries heard so far have merit and we believe that a complete review of the subject is necessary. Accordingly, discussions are being conducted with NavSafeCen representatives and FAA headquarters to resolve the matter and we hope to have new information on this important subject soon.

Work Jacket Stowage

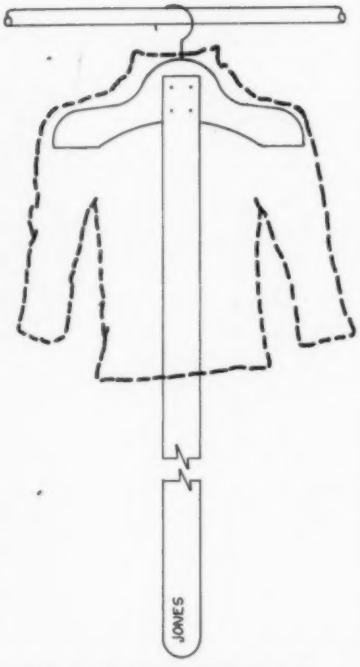
Bethpage, L.I. N.Y. – Just happened to be glancing through the March '68 issue and noticed in Letters a bit from an anonymous airman who was concerned with a work jacket stowage problem.

Maybe you would like to pass this on to him:

Do like we've been doing here at Grumman for years – run a length of pipe between two uprights or columns so that it is situated about 11 or 12 ft above the deck. Get yourself some wooden coat hangers and nail a 6-ft wooden handle on each. Presto! Man comes in, takes a hanger down from the overhead pipe and hangs his coat way up there where it'll stay clean, neat and safely out of the way.

We do this in all of our shop areas and it works like a charm.

Bob Kaelin
Grumman Field Service Group, Plant 1



Wooden clothes hanger with handle attached

• Simple and effective. Get with it, gents.

Phone Cord Fix

NAS Alameda – The communications cord on the APH-6A pilot's protective helmet, FSN 2RQ 8475-078-4738-LF50 which is located in the back left center of the middle section of the cellular polystyrene energy-absorbing material has always been a sore spot for both our pilots and aircrewmembers.

It has been our experience that the men who utilize these helmets invariably would return to the paraloft and have their friendly rigger route the communication cord to the extreme left, or right, as their aircraft radio facilities dictated.

The riggers' solution to this situation is to utilize a small avionics electrical connector clamp, which has a rubber line within it to avoid chafing. This is affixed to the communication cord and by installing it on either nape strap screw gives the individual the desired comfort he seeks.

Realizing that this is indeed a trivial problem (but it's not so trivial to the men who utilize these helmets) you should see their faces light up when the cord is rerouted!

PR 1 James D. Censale

• Good idea. Examination of the details of your suggestion indicate a substantial relief from the nuisance of the phone cord wrapping itself around the shoulder harness or getting caught behind the pilot's head. Some riggers are already using this technique and we suggest others give it a try.

Nape Strap

NAAS Saufley Field – The APH-6 hard hat is a fine piece of gear but even a brand new one won't yield its ultimate protection until every pad, cushion and strap is mated to its wearer. Check-in

procedures in this command allow our riggers to ensure that all students' and instructors' hard hats will fit like a finely tailored suit. Even the nape strap ceases to twist when shortened to a comfortably snug length and then stitched as shown in the accompanying photo. (Fig. 1)

LT R. H. Ross
Aviators' Equipment Officer
VT-5

• This excellent practice is followed by many squadrons. This is a good place to remind our readers that no matter how well a nape strap is fitted, its value is compromised if the chinstrap is not worn properly.

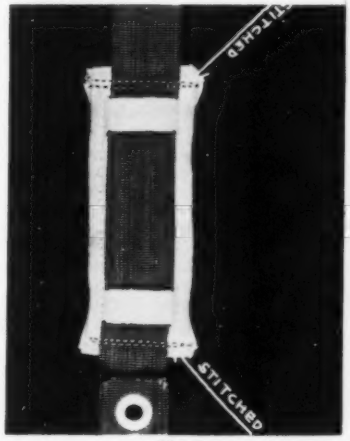


Fig. 1

Roped

MCAS Beaufort, S.C. – Your article titled "Rope and Hoist" in the February, 1969, issue of *APPROACH* was read with interest by myself, "the man in the front seat." Your reporting is accurate with one exception and the comparison on methods of rescue between myself and my RIO is an excellent case to study.

Notwithstanding the possible tragic consequences that might have resulted in the forgetful lack of a survival vest during the rescue, the circumstances leading up to the event are worth reporting. A break in normal habit and procedure precipitated the situation.

As the lead pilot on the afternoon air-to-ground F-4B alert pad at Chu Lai, RVN, I checked into the alert van early and noted the weather, notams, aircraft assignment and ordnance configuration and briefed my flight on flight conduct in the event of a scramble. It had been a very slow morning (no scrambles) so I decided to relieve the morning flight leader early. I walked out of the van approximately 5 minutes prior to the change of relief time and instructed my RIO to follow. My RIO, CAPT Pete Brandon, was delayed a few minutes so I preflighted the aircraft, checked the ordnance and climbed into the front cockpit. No sooner had I sat down when the scramble horn sounded and the ground alert crews were racing for the two ready aircraft. I had the right J79 started when Pete climbed into the back seat and the rest is history.

During the pickup phase of the rescue there were two ropes used vice the one reported in my statement and the article. The second rope was described to me later by the rescue pilot as a Special Forces "sling" (unknown nomenclature) and was of a much stronger gage. That rope – with the efforts of two crewmembers and a Special Forces officer – made it possible to lift me high enough to get a foot on the landing skag and thence into the door of the swaying helo.

Shortly after my return to Chu Lai, at an aircrewmembers' meeting, I debriefed my escape in detail. All nomex flight suit sleeves were resewn with nomex inserts and many of the aircrewmen snapped their survival vests to their torso harnesses to preclude separation.

It is indeed a pleasure to be able to write this letter to what I have always considered an outstanding aviation safety magazine. Without the alternate handle and the Martin-Baker ejection seat and a courageous, alert Army helicopter pilot, this story might never have been told.

LCOL H. T. Hagaman
Executive Officer, MAG-32
2ND MAW

• This is the best kind of feedback. We are glad to use this means to pass on to others your information concerning the Special Forces sling.

Grasshopper Club

THE Stencel Aero Engineering Corporation, developer of the newly installed Dart system and ballistic parachute canopy spreading device, has announced the establishment of the Grasshopper Club. This group is similar in concept to the Caterpillar Club, the prototype of such organizations, (see *APPROACH*, September, 1966, p.47) and the Martin-Baker Tie Club. To be eligible for the Grasshoppers, you must have ejected from an aircraft with Stencel-developed equipment.

Interested persons who qualify for membership in the Grasshopper Club should contact the manufacturer directly at the following address:

Stencel Aero
Engineering Corp.
Box 5836
Asheville, N.C. 28803

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

Division Of Public Documents
Government Printing Office
Washington, D. C. 20402

Please send APPROACH (NavAir 00-75-510) for one year to the following address. Enclosed is a check or Money Order for $7.00. ($8.75 for foreign mailing.)

Name .....

Address .....

City ..... State ..... Zip Code .....

Vol. 14 **approach** No. 10

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

Contents

1 Are You Planning to Abort Your Takeoff?
7 Unscheduled Shortfield Landing
8 Acceptance Test Flight
10 A Bedtime Story for New Plane Commanders
By LT G. D. Nickerson
13 Blow Up
14 Helicopter Instrument Flying!
20 Nearly Everything Right!
24 Photo Finish
26 Up, Up and Away!
30 Rugged Rescue
36 A Real Approach to FOD Prevention
By John B. Crocker and William Strong
41 Follow These Rules, Aviators
42 External Loads
48 44 Which One Would You Feather?

Departments

18 Short Snorts
22 Anymouse
34 Flight Surgeon's Notes
45 Murphy's Law
46 Letters
IBC Lift and Drag

NavWeps 00-75-510

Purposes and policies: Approach, published monthly by the Naval Safety Center, presents the most accurate information currently available on the subject of aviation accident prevention. Contents should not be considered as regulations, orders or directives and may not be construed as incriminating under Art. 31, UCMJ.

Photos: Official Navy or as credited. Non-naval activities are requested to contact NavSafeCen prior to reprinting APPROACH material.

Correspondence: Contributions are welcome. The right to make editorial changes to improve the material without altering the intended meaning is reserved. Reference to commercial products does not imply Navy endorsement. Views of guest written articles are not necessarily those of NavSafeCen.

Distribution: Requests for distribution changes should be directed to NavSafeCen, NAS, Norfolk, Va. 23511. Phone: Area Code 703, 444-4279, Att: Safety Education Dept., IF YOU ARE A PAID SUBSCRIBER, address all renewals and address changes to Division of Public Documents, Washington, D. C. 20402.

Subscriptions: Single copy 60 cents; 1-year subscriptions $7.00; $1.75 additional annually for foreign mailing.

Printing: Issuance of this periodical approved in accordance with Department of the Navy Publications and Printing Regulations, NAVEXOS P-35. Library of Congress Catalog No. 57-60020.

Next Month

Safe Terrain Clearance – The Pilot's Responsibility.

RADM Roger W. Mehle, Commander, Naval Safety Center

CDR C. F. Clark, Editor
LT W. T. T. Hood Jr., Managing Editor
Robert Trotter, Art Director
J. C. Kiriluk, Maintenance Editor
J. A. Bristow, Life Sciences Editor
W. E. Cumbie, Military Editor
C. B. Weisiger, Helicopter Editor
Blake Rader, Illustrator
PHC Harry Culbertson, Photographer

Credits

Cover Painting by Robert McCall shows A-7As being readied for launch. Courtesy LTV Dallas, Texas. **Pg 7** Approach Map by Don Lips. **Pg 44** Photo courtesy Grumman Aircraft Corp. **IBC** Cartoon by Ballow courtesy General Dynamics.

Horse Sense in the Jet Age?

Maybe we should entitle this "What Ever Happened to Common Sense."

In two recent incidents the pilots were informed by ground observers that their aircraft were shedding parts. One was on the gunnery range; the other was taking off on a cross-country. In neither instance did the pilot investigate to determine the extent of the discrepancy; however, the pilots did report that all instrument readings were normal. How about that! Since when have we had sensors and instruments that reflect the condition of the entire aircraft?

Maybe I'm a coward but upon receiving such news I would start thinking in terms of getting the machine and yours truly safely on the ground – but fast.

I would not continue to make gunnery passes and neither would I proceed on a cross-country flight.

Faulty reasoning? Possibly, but we have the best engineers design our aircraft and I accept their judgment that only those bits and pieces are used that are necessary for an aircraft to accomplish its mission. Consequently, when things start falling off, you are short already!

Why try to do the job with part of an aircraft? The job you do may be your last. *Adapted from a speech by LtCol Harold K. Boutwell, Directorate of Aerospace Safety USAF*

Remember, most FOD to engines occurs within the first few minutes following maintenance.